2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Drumbo Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of February on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Drumbo Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120002479
Environmental Compliance Approval (ECA)	#8752-9Q4H96 (February 9, 2015)
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Drumbo Sequencing Batch Reactor (SBR) is a Class II rated treatment facility servicing the village of Drumbo. The SBR plant consists of two alternating reactors, pressure filters and ultra-violet light for disinfection, with an outfall pipe to a wetland area which discharges to the Cowan Drain. Oxford County operates the plant, utilizing the staff located at the Woodstock WWTP. Biosolids are temporarily stored at the Drumbo WWTP and routinely transported to the Woodstock WWTP for digestion.

A standby generator is available to run the onsite water facility and the SBR in the event of a power failure.
The system is maintained by licensed wastewater treatment system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The facility provided effective wastewater treatment in 2017, as demonstrated by the table below.

Facility	Drumbo Wastewater Treatment Plant
Design Capacity	300 m^3/d
2017 Average Daily Flow	274 m^3/d
2017 Maximum Daily Flow	739 m^3/d
2017 Total Volume of Wastewater	99,948 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples are taken using a 24-hour composite sampler on a monthly basis from the transfer tank. This tank receives flow from the trash tank, which holds most of the daily flow.

Effluent samples are taken weekly using a 24-hour composite sampler installed so as to sample during periods of flow from either of the two reactors. Samples are taken on site and tested for pH, dissolved oxygen, and temperature.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, chlorine residual, and temperature which are analyzed in the field.

2.2. Plant Performance & Effluent Quality

The Drumbo WWTP provided effective treatment in 2017 meeting all its regulatory limits for all effluent parameter. On a weekly basis, the Operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2017. Analyses results are summarized below.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A. Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	**Concentration mg/L**	**Loading kg/d**
BOD_5	124	34
Total Suspended Solids	82	22
Total Phosphorus	4	1
Total Kjeldahl Nitrogen	29	8

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
$CBOD_5$	weekly	9.3	2.3 – 7.7	92.1 – 97.7
Total Suspended Solids	weekly	9.3	2.0 – 7.0	91.5 – 97.6
Total Phosphorus	weekly	0.46	0.1 - 0.2	95.0 – 97.5
Total Ammonia Nitrogen (May 1 to October 31)	weekly	2.7	0.73 – 1.72	--
Total Ammonia Nitrogen (Nov. 1 to April 30)	weekly	4.5	1.23 – 3.28	--
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2 – 13.5 organisms/100 mL	--
DO	weekly	5.0 or higher	6.4 - 9.2	--

pH any single sample	weekly	6.0 - 9.5	6.9 – 7.9	--

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives (summarized below) are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	Sample Frequency	Monthly Average Objective Concentration (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	4.7	2.3 – 7.7
Total Suspended Solids	weekly	4.7	2.0 – 7.0
Total Phosphorus	weekly	0.27	0.1 - 0.2
Total Ammonia Nitrogen (May 1 to October 31)	weekly	1.8	0.73 – 1.72
Total Ammonia Nitrogen (Nov. 1 to April 30)	weekly	3.6	1.23 – 3.28
E. coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	2 – 13.5 organisms/100 mL
DO	weekly	6 or higher	6.4 - 9.2
pH any single sample	weekly	6.5 - 8.5	6.9 – 7.9

Exceedances of the Objects in the 2017 monthly average results included the following:

Month	Parameter	Objective (mg/L)	Monthly Average Result (mg/L)
January	INF. FLOW	300 m^3/d	330 m^3/d
	$CBOD_5$	4.7	7.7
	TSS	4.7	7.0
February	INF. FLOW	300 m^3/d	304 m^3/d
March	INF. FLOW	300 m^3/d	342 m^3/d
April	INF. FLOW	300 m^3/d	394 m^3/d
May	INF. FLOW	300 m^3/d	356 m^3/d
	TSS	4.7	5.8
June	TSS	4.7	7.0
July	TSS	4.7	5.3
September	TSS	4.7	4.8
November	TSS	4.7	6.0
December	TSS	4.7	5.6

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

The Drumbo SBR is nearing its rated capacity and as such achieving the treatment objectives is occasionally challenging. The County is currently undertaking a Class Environmental Assessment to expand the treatment facility to address the constraints.

4. Maintenance of Works

The operating and maintenance staff conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system to issue work orders and maintain records for regular maintenance and repair at the wastewater treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by Flowmetrics Technical Services Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

6. Biosolids 2017

Co-thickened primary sludge is transported to Woodstock WWTP for further treatment.

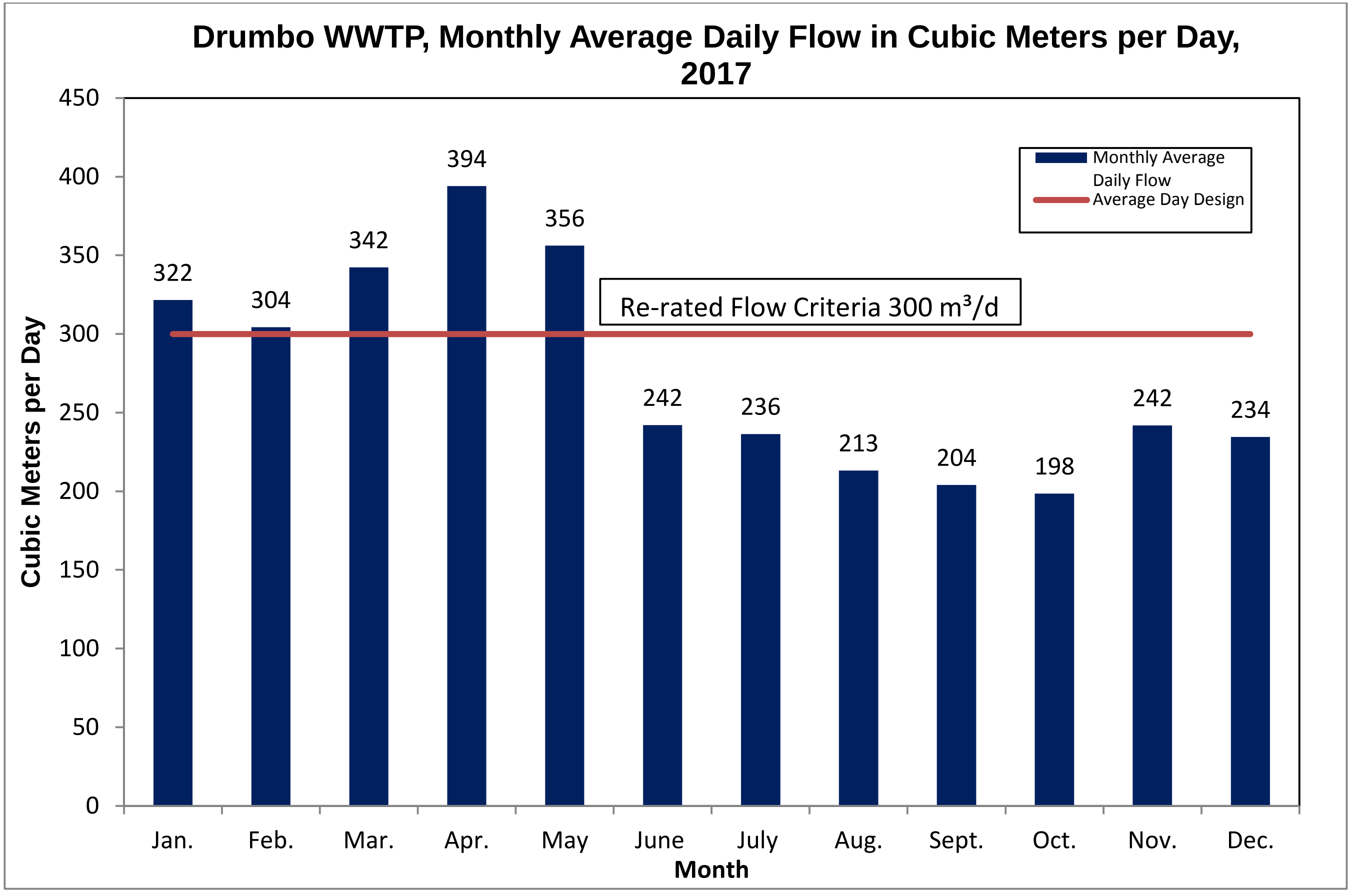
Biosolids are anaerobically digested and dewatered at the Woodstock WWTP using two Alfa-Laval Centrifuges. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

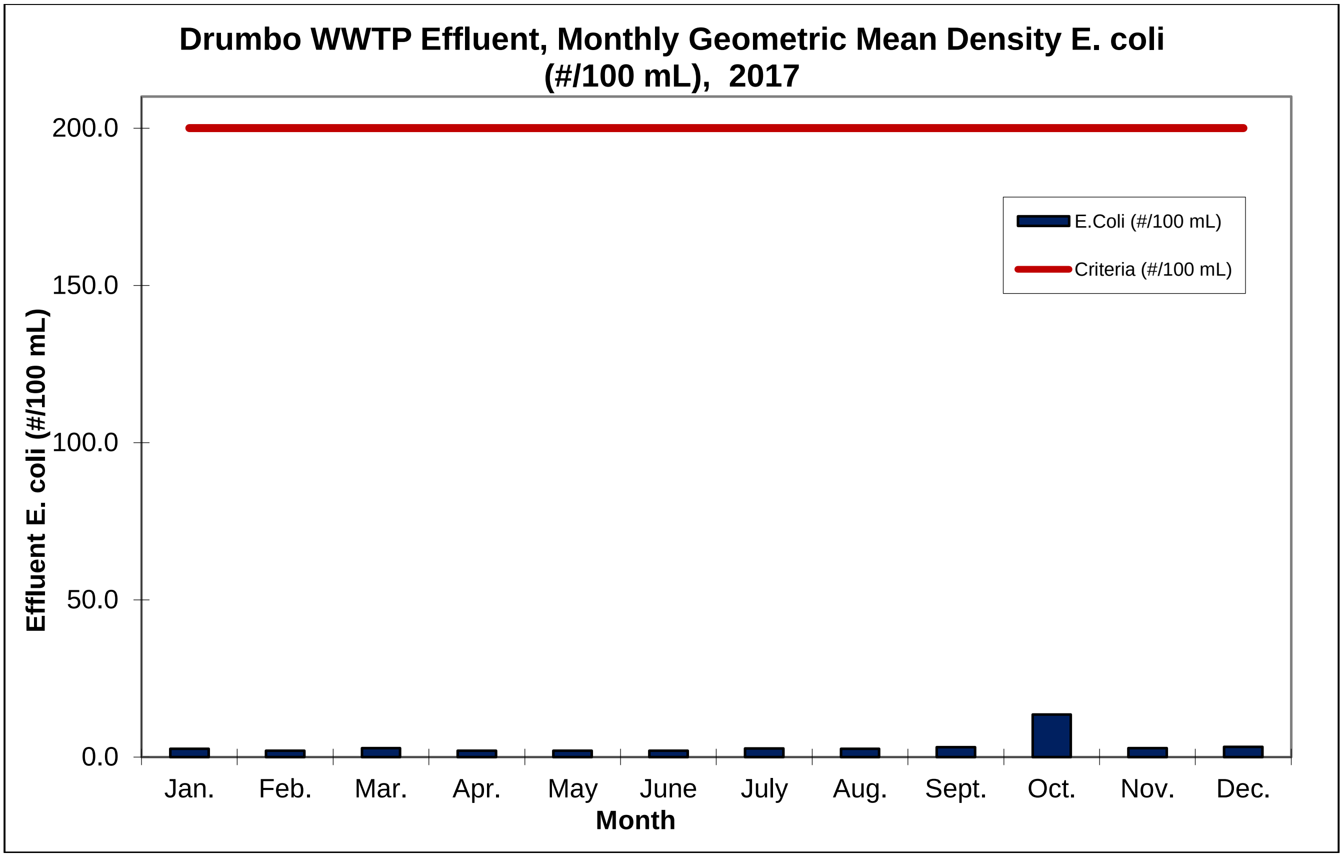
7. Audits, Pilots, and Trials

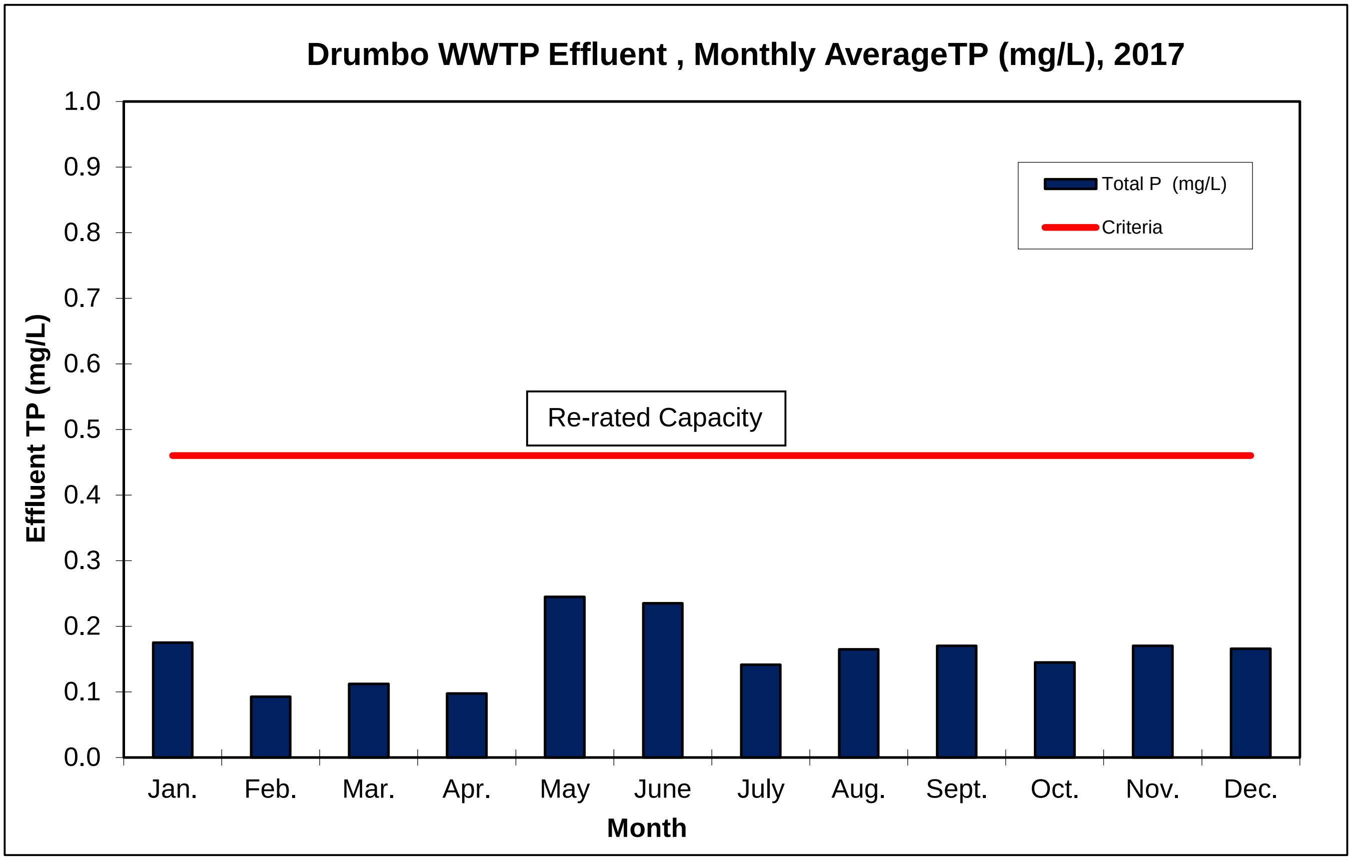
The Ministry of Environment and Climate Change (MOECC) did not conduct a facility inspection in 2017. The MOECC inspections typically occur on a 3-year schedule.

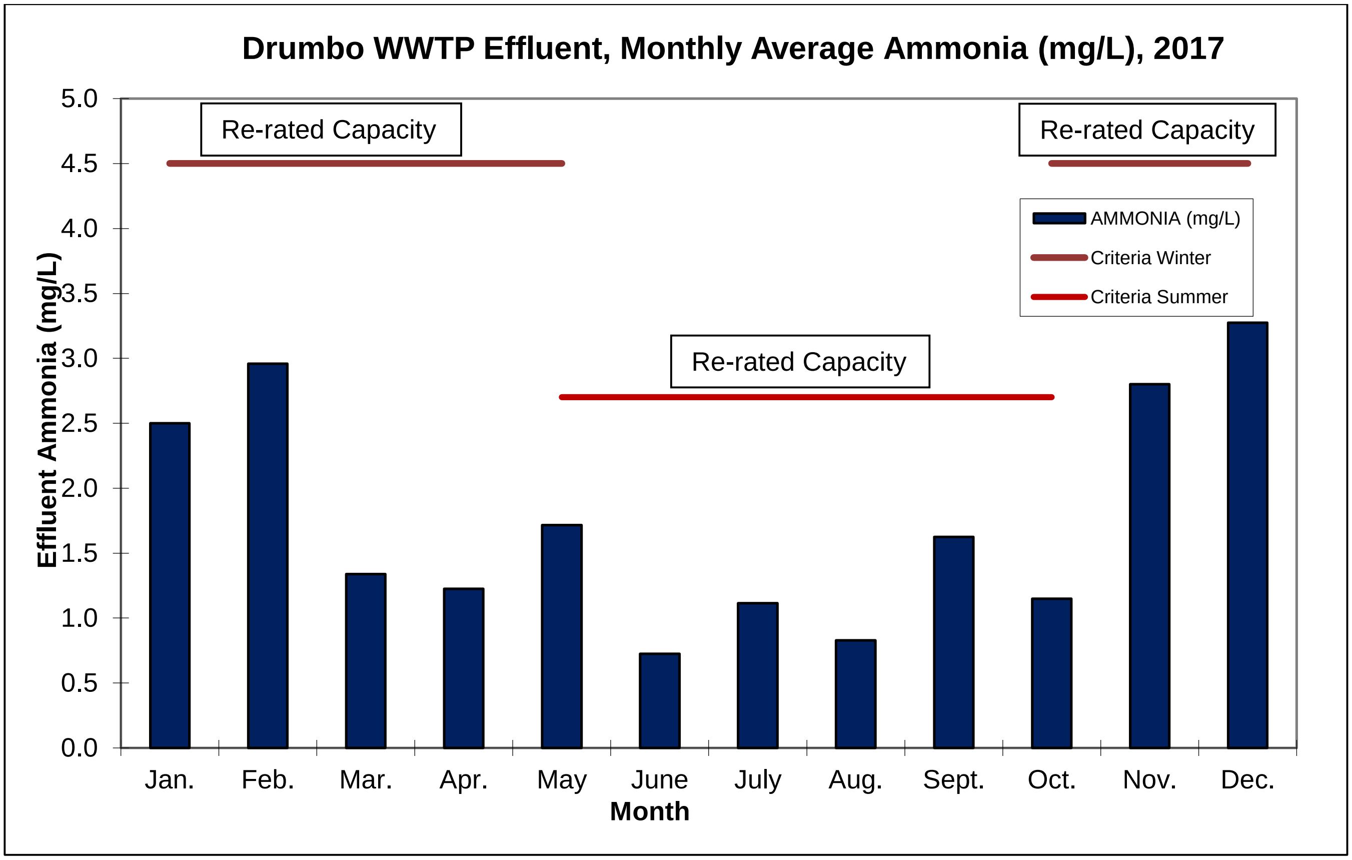
The plant was included in the Annual Watershed WWTP Performance Report of the Grand River Conservation Authority (GRCA). Oxford County continues to supply data voluntarily and sit with the wastewater group at their regular meetings at the GRCA.

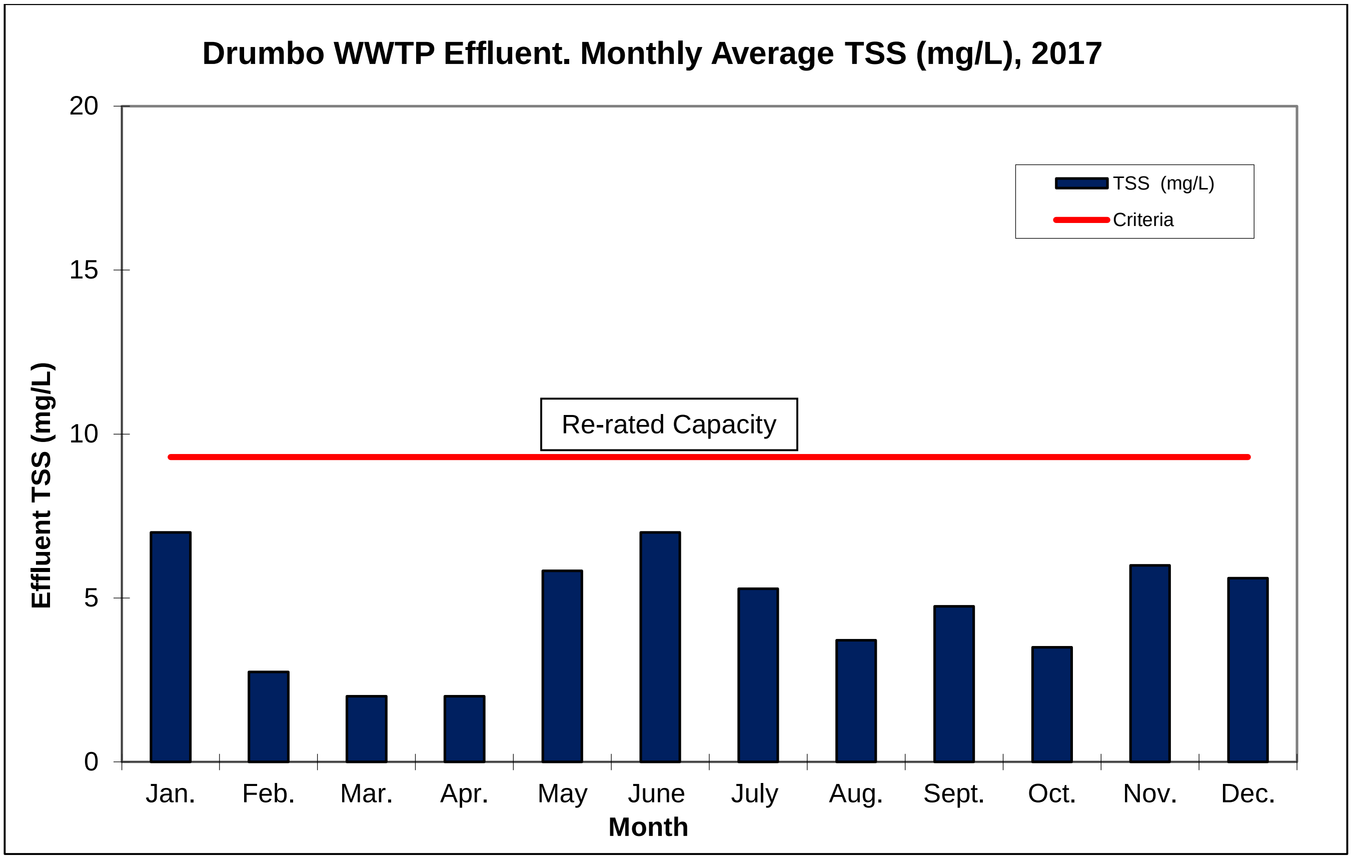
APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS






Drumbo WWTP Effluent , Monthly AverageTP (mg/L), 2017
Effluent TP (mg/L)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Total P (mg/L)
Criteria
Re-rated Capacity
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month


Drumbo WWTP Effluent, Monthly Average Ammonia (mg/L), 2017
Effluent Ammonia (mg/L)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Re-rated Capacity
Re-rated Capacity
AMMONIA (mg/L)
Criteria Winter
Criteria Summer
Re-rated Capacity
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month


Drumbo WWTP Effluent. Monthly Average TSS (mg/L), 2017
20
15
10
5
0
Effluent TSS (mg/L)
TSS (mg/L)
Criteria
Re-rated Capacity
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month

2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Ingersoll Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant’s operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Ingersoll Wastewater Treatment Plant (WWTP)
Wastewater Treatment Plant Number:	110003969
Environmental Compliance Approval (ECA)	#1614-A28P9L
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Ingersoll WWTP is a Class III rated treatment facility and provides wastewater treatment for residential, commercial, and industrial users in the Town of Ingersoll. It also provides treatment for septic tank waste, hauled waste, holding tank waste, and landfill leachate from within Oxford County.

The two treatment trains within the Ingersoll WWTP began operation in 1947 and 1974. Both are conventional activated sludge plants consisting of primary and secondary treatment sharing an ultraviolet light disinfection system and a single discharge point into the Thames River. The plant utilizes anaerobic digestion followed by dewatering to produce stabilized biosolids. The biosolids are then transported to dedicated offsite storage prior to beneficial reuse on agricultural land.

A standby generator is available to run the onsite Ingersoll Main Lift Station in the event of a power failure.
The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The wastewater treatment plant is located at 56 McKeand St., Ingersoll, Ontario. The Facility description is provided below.

Facility	Ingersoll Wastewater Treatment Plant
Design Capacity	10,230 m^3/d
2017 Average Daily Flow	7,291 m^3/d

2017 Maximum Daily Flow	26,769 m^3/d
2017 Total Volume of Wastewater	2,659,704 m^3/year
2017 Total Received Hauled Waste	18,630 m^3/year (leachate only)

Since 2015, the Ingersoll WWTP has been undergoing several upgrades to increase the capacity of the plant. The construction work is expected to be completed in 2018.

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples are collected monthly and effluent samples are collected weekly using a composite sampler over a 24-hour period. Raw sewage samples are collected at the main lift station located on-site; the sample is drawn after the lift station pumps and prior to the primary tanks of either plant. Effluent is sampled directly from the combined flow after it leaves the UV disinfection system prior to final discharge and comprises the final treated effluent sample for the entire facility.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All other in-house testing is done for process control, the results of which are not included in this report.

2.2. Plant Performance & Effluent Quality

The Ingersoll WWTP provided effective treatment in 2017 meeting all its regulatory limits for all parameters in the Plant effluent discharged to the Thames River.

Approximately four times a week, the operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6.0 - 9.5 in 2017.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A. Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD_5	146	1066
Total Suspended Solids	148	1082
Total Phosphorus	2.4	17
Total Kjeldahl Nitrogen	20.5	149

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
$CBOD_5$	weekly	25	4.0 – 11.0	92.5 – 97.3

Total Suspended Solids	weekly	25	7.0 – 12.5	91.6 – 95.3
Total Phosphorus	weekly	1	0.28 – 0.60	75.0 – 88.3
pH any single sample	weekly	6.0 - 9.5	6.64 – 7.77	N/A
E. coli	Weekly	200 organisms/100 mL (Monthly Geometric Mean Density)	2.0 – 14.0 organisms/100 mL	N/A

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Ingersoll WWTP in 2017 with the exception of three single samples. Two samples for high Total Suspended Solids (TSS) with a concentration of 17 mg/L on October 18, and 18 mg/L on October 25 when the objective concentration is 15 mg/L. The average monthly TSS concentration for October was 12 mg/L. As well, a single sample for high $CBOD_5$ with a concentration of 18 mg/L occurred on August 2 while the objective concentration is 15 mg/L. The average monthly $CBOD_5$ concentration for August was 8.6 mg/L.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	15	4.0 – 11.0
Total Suspended Solids	weekly	15	7.0 – 12.5
Total Phosphorus	weekly	0.75	0.28 – 0.60
pH any single sample	weekly	6.5 - 9.0	6.64 – 7.77
E. coli	weekly	100 organisms/100 mL (Monthly Geometric Mean Density)	2.0 – 14.0 100 organisms/100 mL

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There was a spill during construction on June 26, 2017 of approximately 1,000 liters of raw wastewater. The spill was caused by construction activity damaging the plant influent pipe. The spill was contained on-site and pumped back into the treatment tanks once the leak was stopped. The event was reported to the MOECC at the time it occurred.

On December 1, 2017 there was a leak of approximately 10 m^3 of wastewater from the forcemain that connects the 401 Eastbound Service Centre to the Ingersoll sewer system. The leak was caused by a third party contractor breaking the forcemain during scheduled excavation work. A vacuum truck was called in and the affected area was cleaned up immediately.

This event was reported to the MOECC at the time it occurred and no further action was required.

4. Maintenance of Works

The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by Flowmetrics Technical Services in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

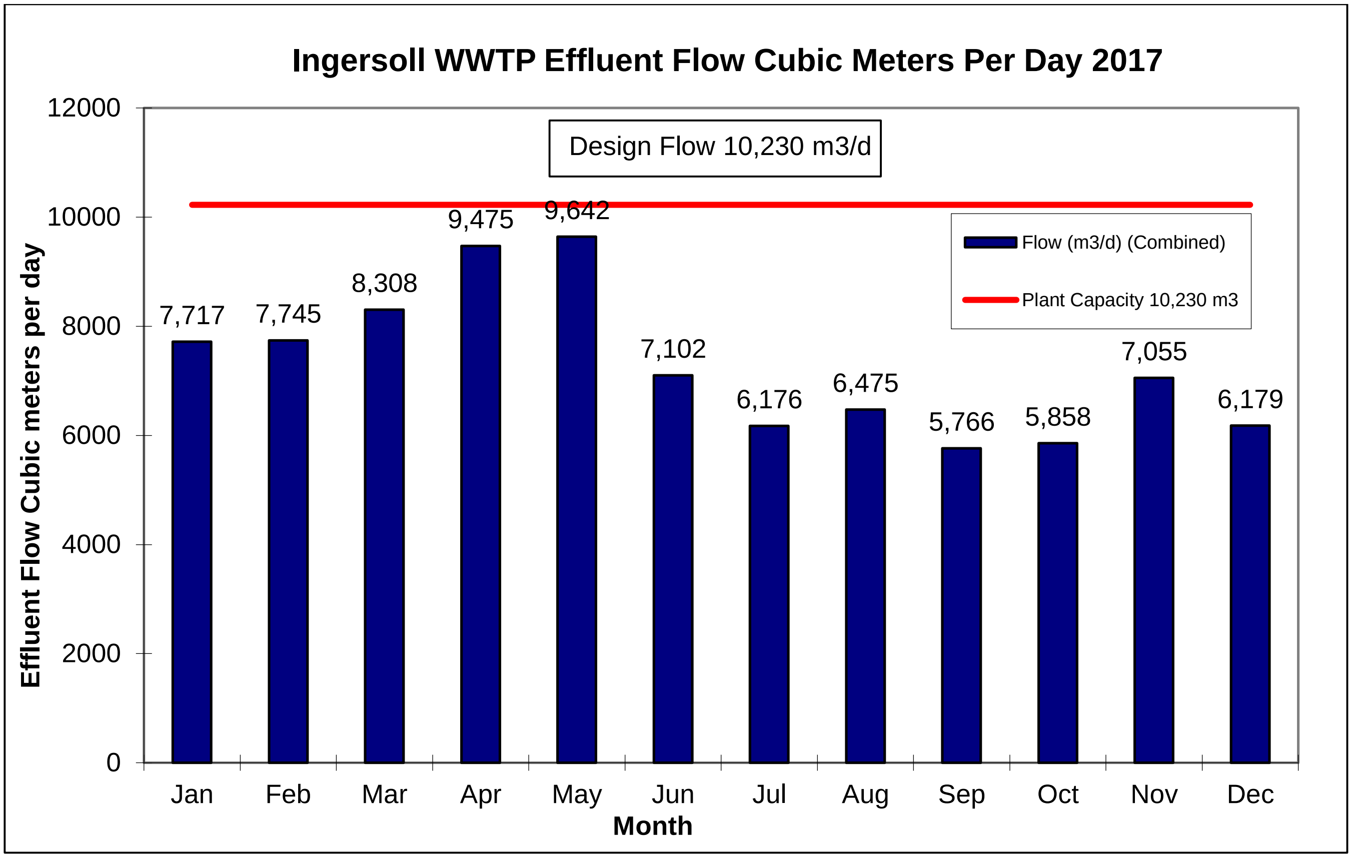
6. 2017 Biosolids Program

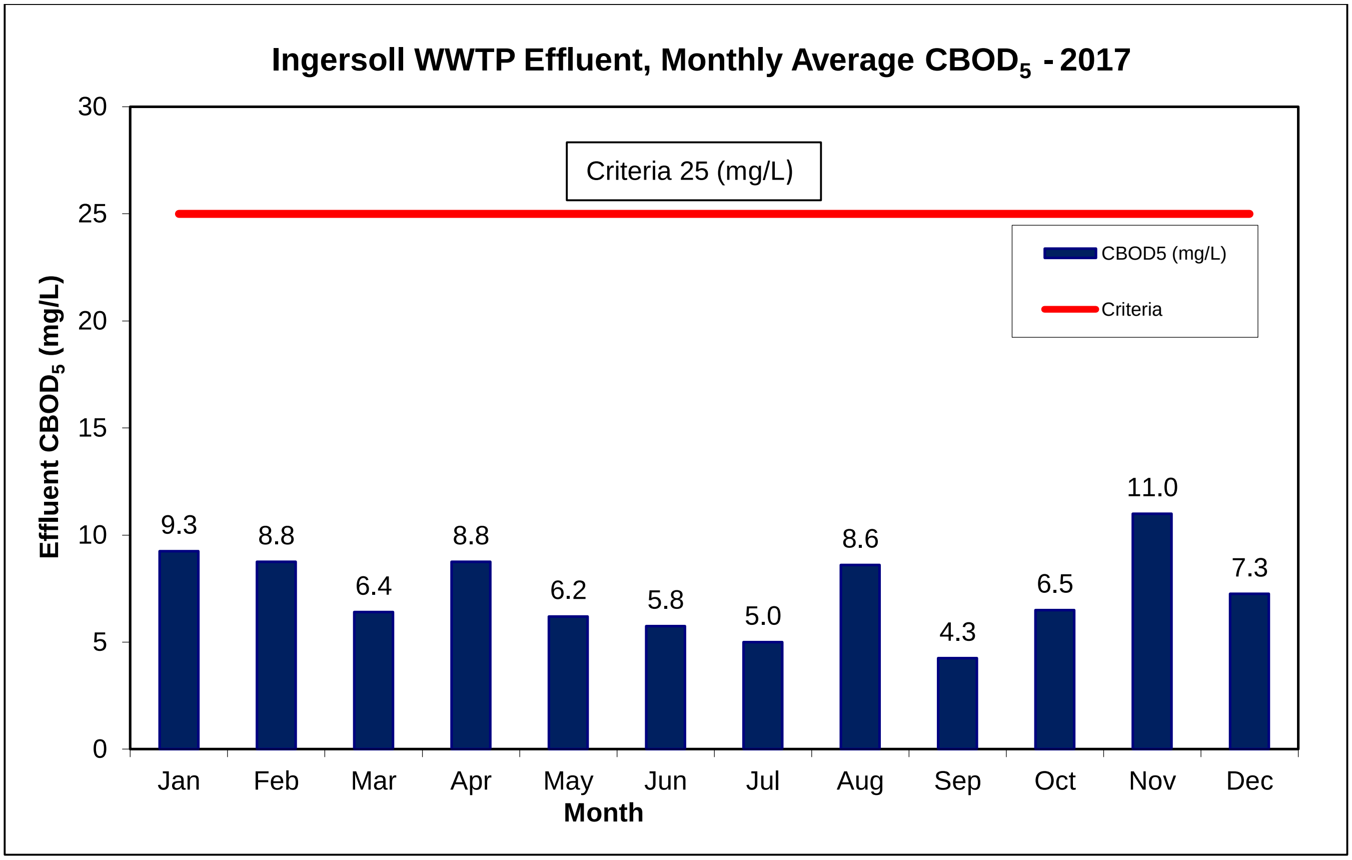
Biosolids are anaerobically digested and dewatered at the Ingersoll WWTP using an Alfa-Laval Centrifuge. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at: www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports

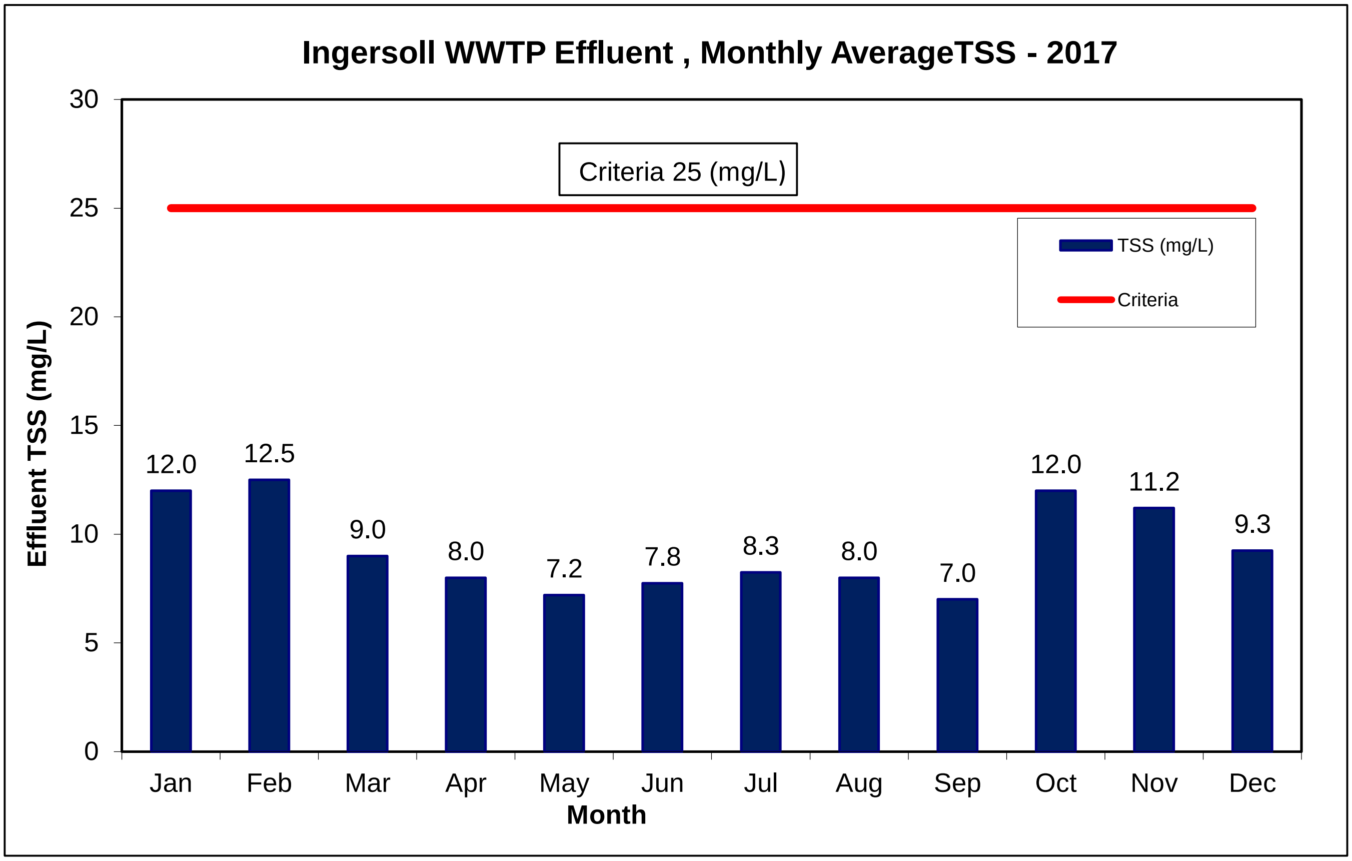
7. Audits, Pilots, and Trials

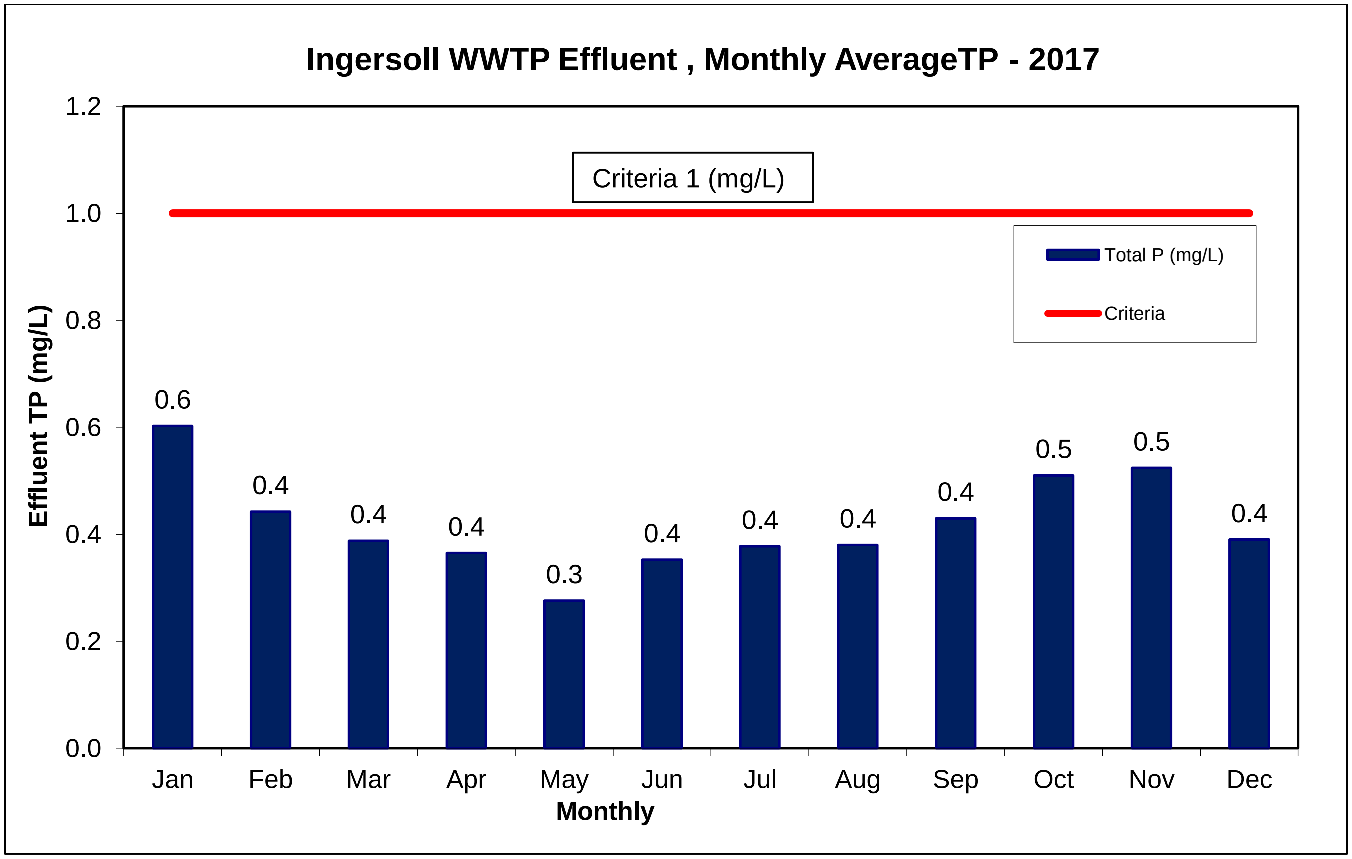
There was no MOECC audit in 2017.

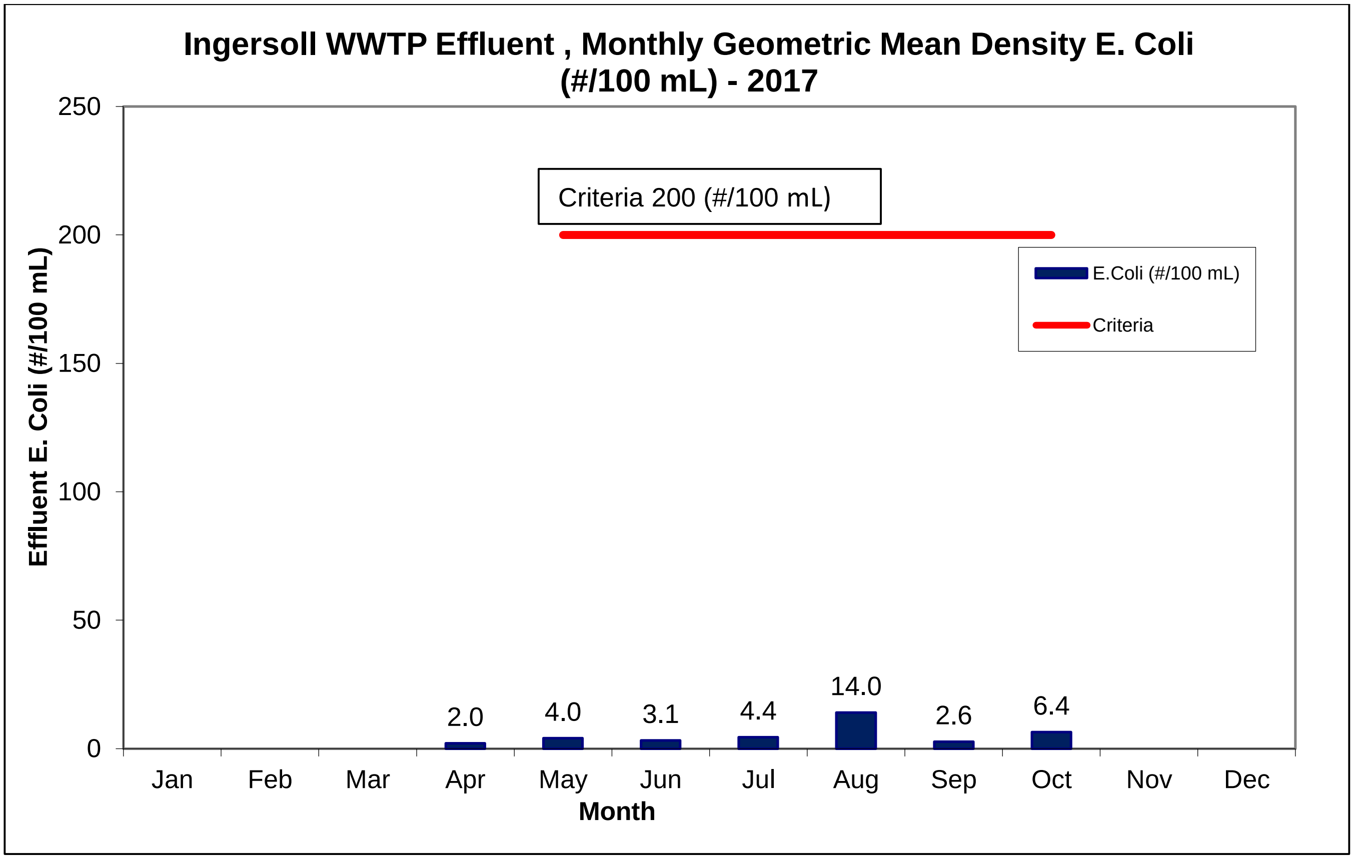
APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS






Ingersoll WWTP Effluent , Monthly AverageTSS - 2017
Criteria 25 (mg/L)
TSS (mg/L)
Criteria
Effluent TSS (mg/L)
30
25
20
15
10
5
0
12.0
12.5
9.0
8.0
7.2
7.8
8.3
8.0
7.0
12.0
11.2
9.3
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Ingersoll WWTP Effluent , Monthly AverageTP - 2017
Criteria 1 (mg/L)
Total P (mg/L)
Criteria
Effluent TP (mg/L)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.6
0.4
0.4
0.4
0.3
0.4
0.4
0.4
0.4
0.5
0.5
0.4
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Monthly


Ingersoll WWTP Effluent , Monthly Geometric Mean Density E. Coli (#/100 mL) - 2017
Effluent E. Coli (#/100 mL)
250
200
150
100
50
0
Criteria 200 (#/100 mL)
E.Coli (#/100 mL)
Criteria
2.0
4.0
3.1
4.4
14.0
2.6
6.4
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Mount Elgin Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Mount Elgin Wastewater Treatment Plant
Wastewater Treatment Plant Number:	20002870
Environmental Compliance Approval (ECA)	#0611-6Q3JQL
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Mount Elgin Wastewater Treatment Plant (WWTP) consists of a central Recirculating Sand Filter (RSF) and subsurface discharge. . Within the collection system, individual properties are serviced by septic tanks where sewage is pretreated to remove solids and grease before discharge to a small diameter viable grade sewer. The small diameter collection mains direct the primary treated effluent to a pump station.

The primary treated effluent is pumped to the recirculation tanks. The influent is pumped to the recirculating sand filter and then collected and pumped to a splitter valve that allows 80% of the flow to recirculate and 20% to enter the dosing tank. From the dosing tank, treated effluent is pumped to the shallow buried trench drainfield that provides for the subsurface discharge of the treated effluent. Effluent samples are collected from the dosing tank ahead of the drainfield.

A standby generator plug-in is available with a manual switch in the event a prolonged power outage requires the use of a mobile generator.

The Mount Elgin Wastewater Treatment Plant (WWTP) provided effective wastewater treatment in 2017 as demonstrated in the table below.

Facility	Mount Elgin Wastewater Treatment Plant
Design Capacity	190.5 m^3/d
2017 Average Daily Flow	71 m^3/d

2017 Maximum Daily Flow	148 m^3/d
2017 Total Volume of Wastewater	25,825 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Grab samples are collected from the influent lift station on a quarterly basis. Samples are tested for Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Total Suspended Solids (TSS), Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN).

Effluent grab samples are analyzed for $CBOD_5$, TSS, TP, ammonia, TKN, nitrite, nitrate, pH, and E. coli at least quarterly.

Groundwater testing for nitrites, nitrates, and pH is completed on a quarterly basis.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples for all parameters except for pH, which is tested in the field during collection. These results are used in this report for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

2.2. Plant Performance & Effluent Quality

There are no effluent limits for the system, however, the ECA requires Oxford County to use best efforts to operate the sewage treatment facility with the objective that the concentrations of both $CBOD_5$ and Suspended Solids do not exceed 10 mg/L in the effluent ahead of the subsurface disposal system.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and groundwater sampling results are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
$CBOD_5$	125	8.9
Total Suspended Solids	45	3.2
Total Phosphorus	7.7	0.5
Total Kjeldahl Nitrogen	67.4	4.8

Ground Water Results:

	2017						
	Well 1	**Well 2**	**Well 3**		**Well 1**	**Well 2**	**Well 3**
Parameter	**March 6/17**	**March 6/17**	**March 6/17**		**May 10/17**	**May 10/17**	**May 10/17**
Well Level (meters)	3.17	3.67	3.96		3.21	3.66	3.96
Nitrite (mg/L N)	0.03	0.03	0.03		0.03	0.03	0.03
Nitrate (mg/L N)	0.06	5.27	1.36		0.06	2.02	0.96
Nitrate+Nitrite (mg/L N)	0.06	5.27	1.39		0.06	2.02	0.99

pH	7.45	7.53	7.51		6.91	7.18	7.18
	Well 1	**Well 2**	**Well 3**		**Well 1**	**Well 2**	**Well 3**
Parameter	**Nov 30/17**	**Sept 20/17**	**Sept 20/17**		**Oct 31/17**	**Oct 31/17**	**Oct 31/17**
Well Level (meters)	2.68	2.99	3.06		2.44	3.23	3.43
Nitrite (mg/L N)	0.03	0.03	0.06		0.03	0.03	0.08
Nitrate (mg/L N)	0.06	1.35	3.86		0.06	6.76	3.06
Nitrate+Nitrite (mg/L N)	0.06	1.35	3.92		0.06	6.79	3.14
pH	7.21	7.45	7.45		7.86	7.73	7.7
Well depths	3.66m	3.96m	3.96m				

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Mount Elgin WWTP in 2017.

The following table presents the range of effluent discharge values vs. ECA Objectives ahead of the subsurface disposal system.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	10	3.0 – 4.0
Total Suspended Solids	weekly	10	2.0 – 2.5

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypassing, upsets, spills, or abnormal conditions in 2017 at the Mount Elgin WWTP.

On May 9, 2017 there was a leak from a customer's wastewater service connection of approximately 0.5 m^3 and was reported by a contractor working on the property. The leak was within the wellhead protection area for the Mount Elgin municipal drinking water system and County staff were dispatched to the site to oversee that the leak was repaired and that contaminated soil was removed from the area.

This event was reported to the MOECC at the time it occurred and no further action was required.

4. Maintenance of Works

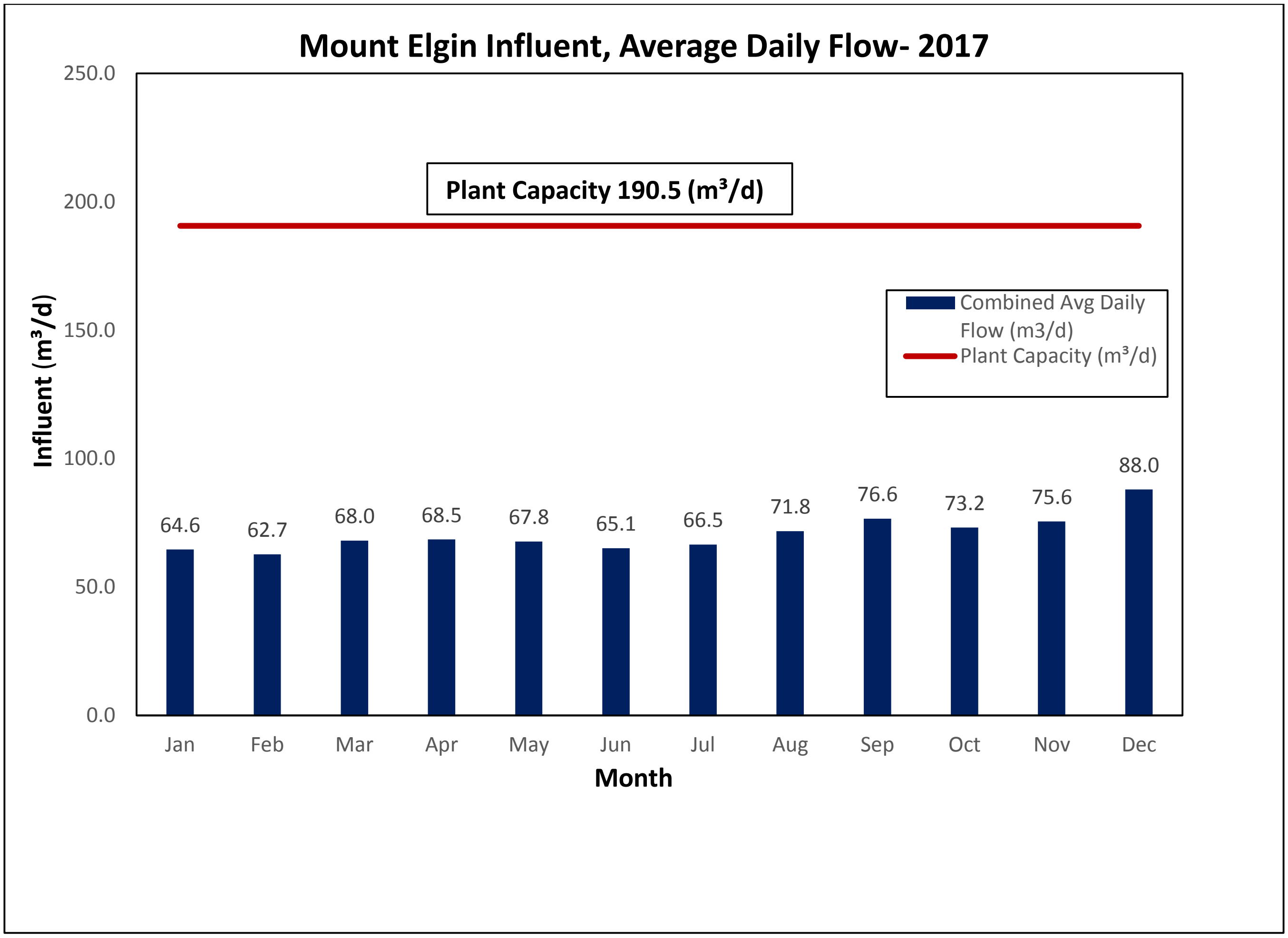
The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

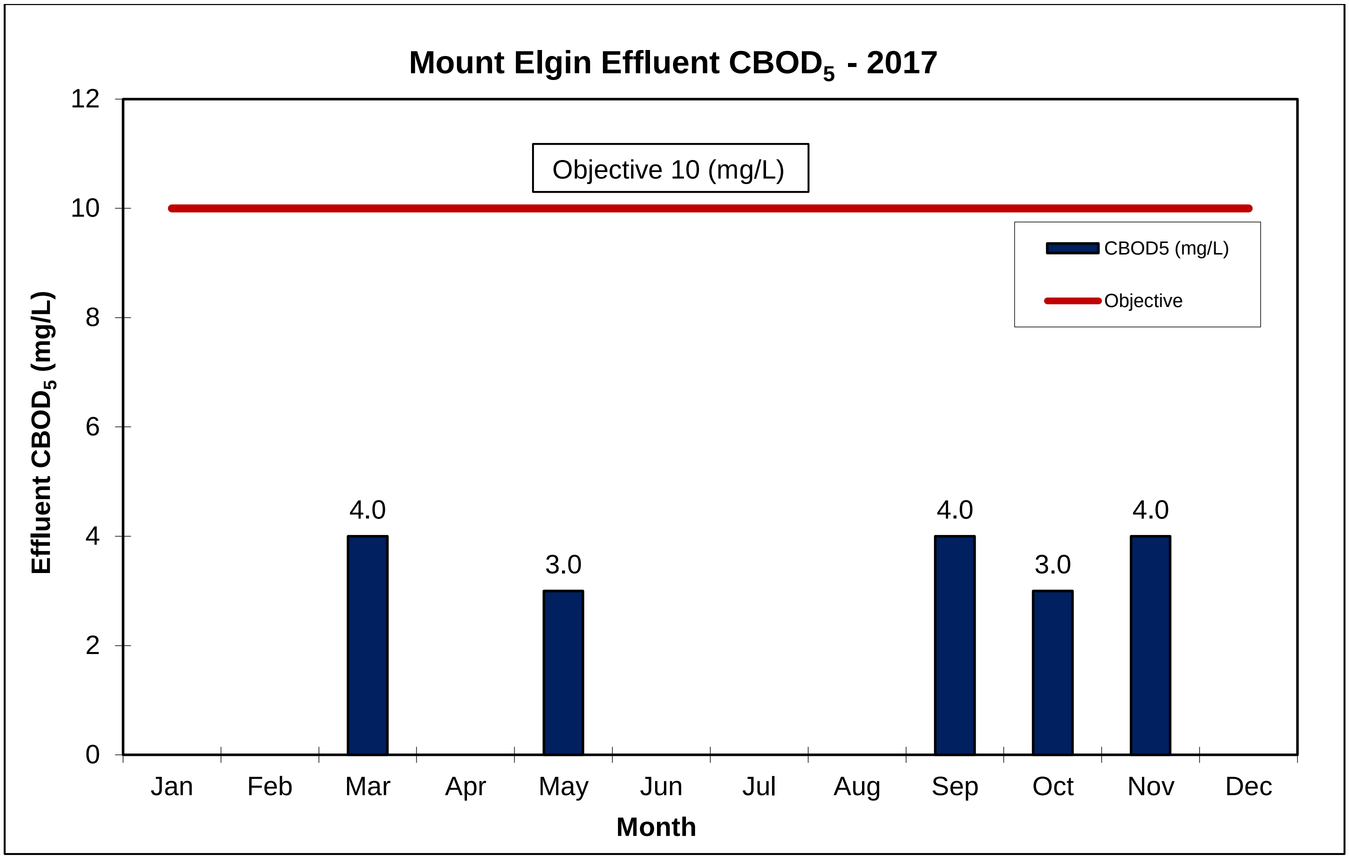
5. Monitoring Equipment Maintenance and Calibration

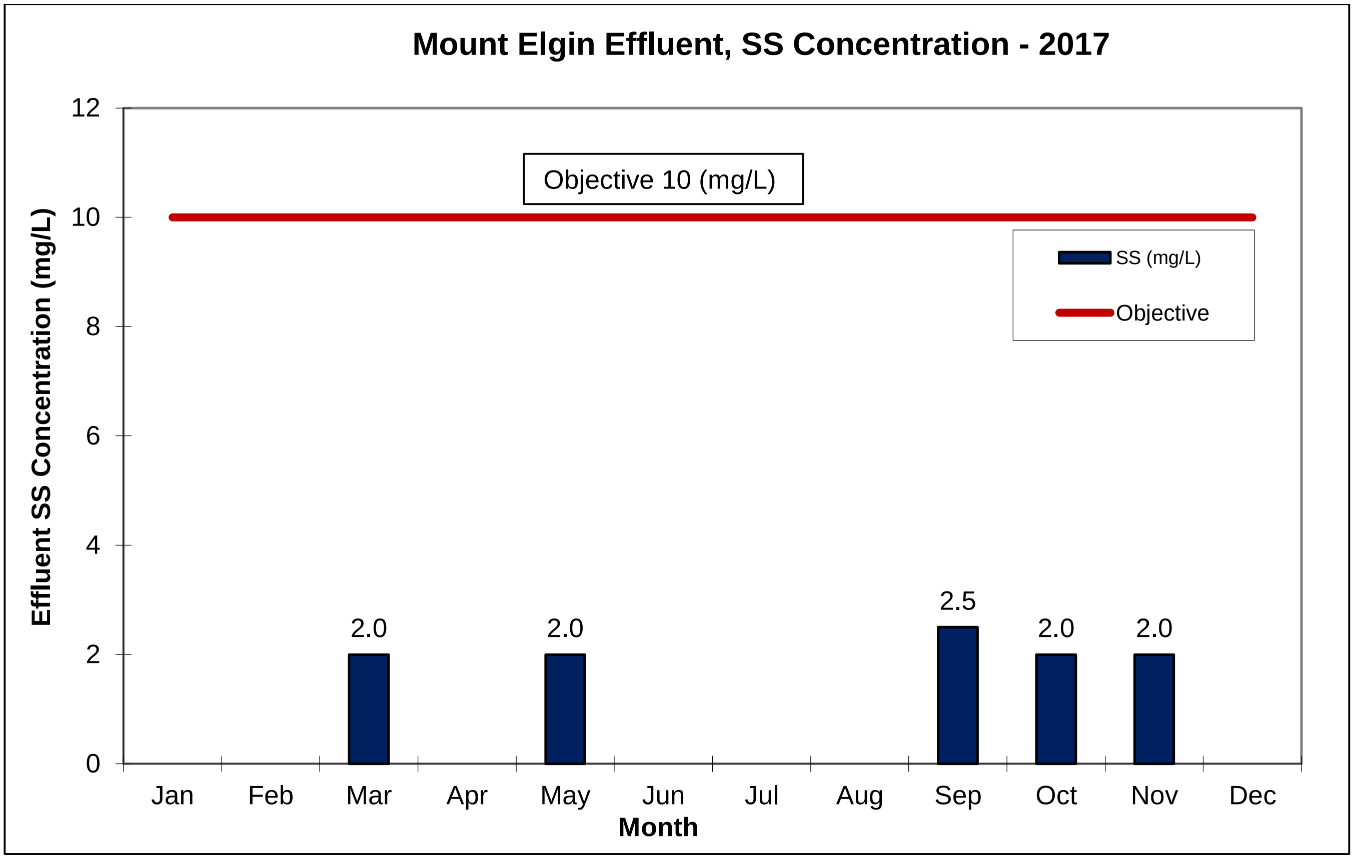
Calibration of flow meters is conducted Flowmetrics Technical Services Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS




Mount Elgin Effluent CBOD5 - 2017
Objective 10 (mg/L)
CBOD5 (mg/L)
Objective
Effluent CBOD5 (mg/L)
0
2
4
6
8
10
12
4.0
3.0
4.0
3.0
4.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Mount Elgin Effluent, SS Concentration - 2017
Objective 10 (mg/L)
SS (mg/L)
Objective
Effluent SS Concentration (mg/L)
0
2
4
6
8
10
12
2.0
2.0
2.5
2.0
2.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Norwich Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Norwich Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110001480
Environmental Compliance Approval (ECA)	#1680-6F6QR5
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Norwich WWTP is a Class I facility and provided effective wastewater treatment in 2017. The Norwich WWTP is a lagoon wastewater treatment system serving the community of Norwich. The wastewater is pumped from two pump stations to a splitter box; then to either of two lagoon cells as determined by the operator. Typically the wastewater is directed to the North Cell which is operated in series with the South Cell, followed by filtering of the effluent through the sand filter beds performed for a period each day, as required. The lagoons may discharge year-round; however, the freezing period prevents discharge through the filter beds (normally December to April).

The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The wastewater treatment plant is located at Lot 7, Conc. 5, Norwich Township. The Facility description is provided below.

Facility	Norwich Wastewater Treatment Plant
Design Capacity	1,530 m^3/d
2017 Average Daily Flow	1,101 m^3/d
2017 Maximum Daily Flow	4,854 m^3/d
2017 Total Volume of Wastewater	401,058 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples are taken from the Lagoon influent splitter box. The sampling frequency is once per week and samples are tested for Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS) monthly, Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN) weekly.

Effluent samples are taken using a 24-hour composite sampler set to take a sample every 15 minutes for the duration of the discharge period. BOD_5 and TSS are sampled at least monthly. TP, ammonia, TKN, pH, and temperature samples are taken three times per week; E. coli and dissolved oxygen are tested at least weekly.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples for all parameters except for pH, temperature, and dissolved oxygen which are tested in the field during collection. These results are used for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

2.2. Plant Performance & Effluent Quality

The Norwich WWTP provided effective treatment in 2017 and met all discharge quality limits. Norwich Lagoons did not surpass the influent daily flow limit of 5,160 m^3/d.

The operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2017.

The lab reported un-ionized ammonia results were all less than the limits listed in the ECA for 2017.

There were no exceedances of the loadings limits listed in the ECA to the Big Otter Creek in 2017.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD_5	161	177
Total Suspended Solids	188	207
Total Phosphorus	4.7	5
Total Kjeldahl Nitrogen	44	48

Effluent Parameter	**Sample Frequency** (when discharging)	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
BOD_5	monthly	10	2 - 5	96.9 – 98.8
Suspended Solids	monthly	10	2 - 4	97.9 - 98.9
Total Phosphorus (non-freezing period)*	3/week	0.5	0.14 - 0.28	94.0 – 97.0

Total Phosphorus (freezing Period)*	3/week	1	0.21 - 0.34	92.8 – 95.5
Total Ammonia Nitrogen (non-freezing period)*	3/week	3	0.1 - 1.7	--
Total Ammonia Nitrogen (freezing period)*	3/week	5	0.6 – 1.6	--
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	9.6 – 69.4 organisms/100 mL	--
pH any single sample	3/week	6.0 - 9.5	6.93 – 8.55	--

* Freezing period means the period of time during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius, normally from December 1, 2017 to April 30, 2017.

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

There were five single sample objective failures related to ammonia, five single sample objective failures related to TP, and two BOD loading objective fails during the discharge from the lagoon in 2017. The results are below.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency** (when discharging)	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
BOD$_5$	monthly	5	2 - 5
Total Suspended Solids	monthly	5	2 - 4
Total Phosphorus (non-freezing period) *	3/week	0.3	0.14 - 0.28
Total Phosphorus (freezing period)*	3/week	0.8	0.21 - 0.34
Total Ammonia Nitrogen (non-freezing period) *	3/week	2	0.1 - 1.7
Total Ammonia Nitrogen (freezing period)*	3/week	4	0.6 - 1.6
E. coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	9.6 - 69.4 organisms/100 mL

* Freezing period means the period of time during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius, normally from December 1, 2017 to April 30, 2017.

Norwich single sample effluent objective exceedances in 2017 included the following:

Date	Parameter	Objective mg/L	Result mg/L
June 7	NH3-N	2.0	2.4
June 12	NH3-N	2.0	4.1
June 15	NH$_3$-N	2.0	3.0
June 19	NH3-N	2.0	4.4
June 21	NH$_3$-N	2.0	2.8
June 19	TP	0.3	0.34

June 29	TP	0.3	0.31
July 17	TP	0.3	0.32
July 19	TP	0.3	0.31
July 26	TP	0.3	0.31
April	BOD loading	11.8 kg/d	13.1 kg/d
December	BOD loading	11.8 kg/d	11.9 kg/d

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypasses, upsets or spills in 2017 however, construction activity in the fall/winter of 2017 related to the replacement of the influent splitter box required some adjustment of lagoon levels and changing of cells receiving influent during the winter months.

4. Maintenance of Works

The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

5. Monitoring Equipment Maintenance and Calibration

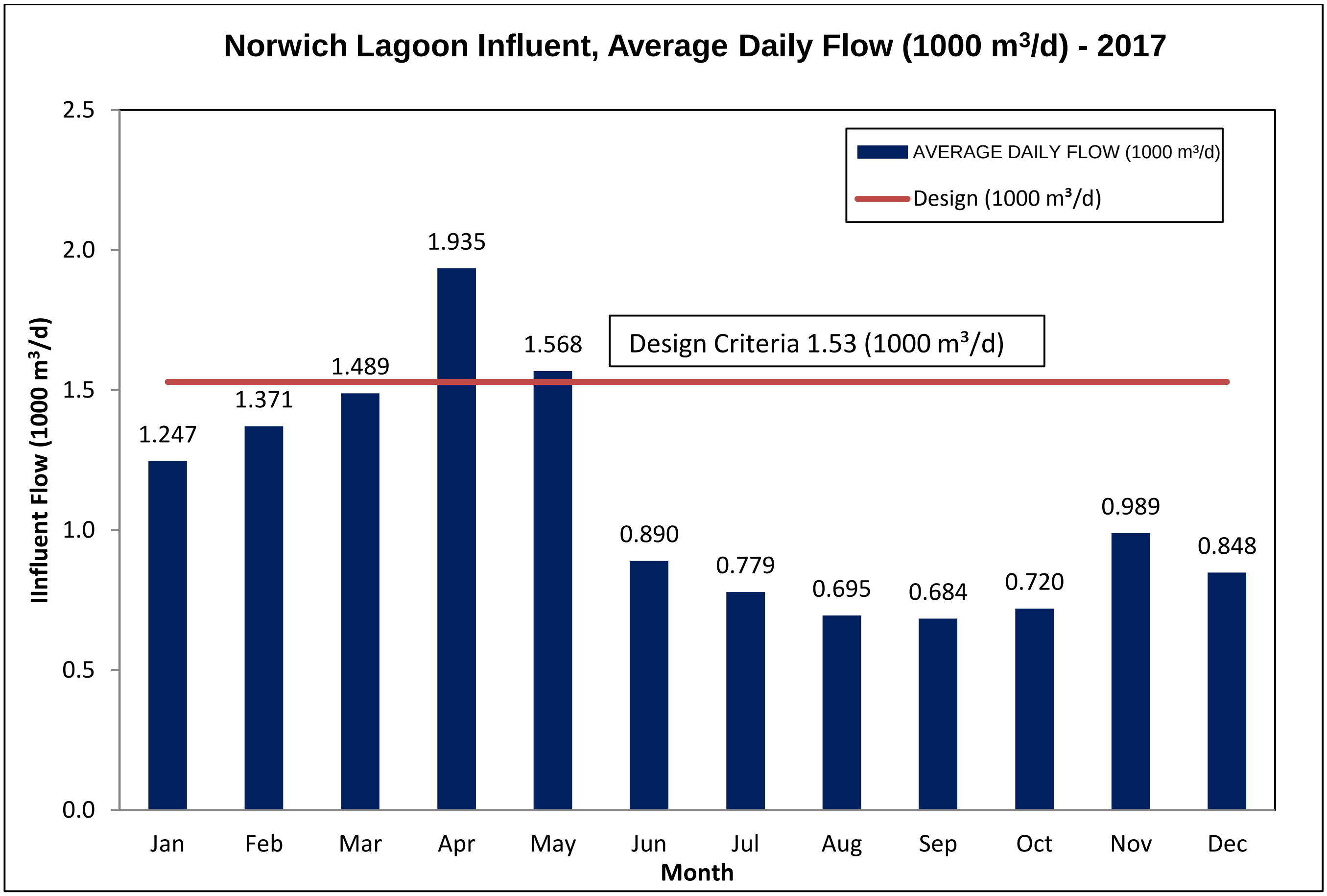
Calibration of flow meters is conducted by Flowmetrics Technical Services Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

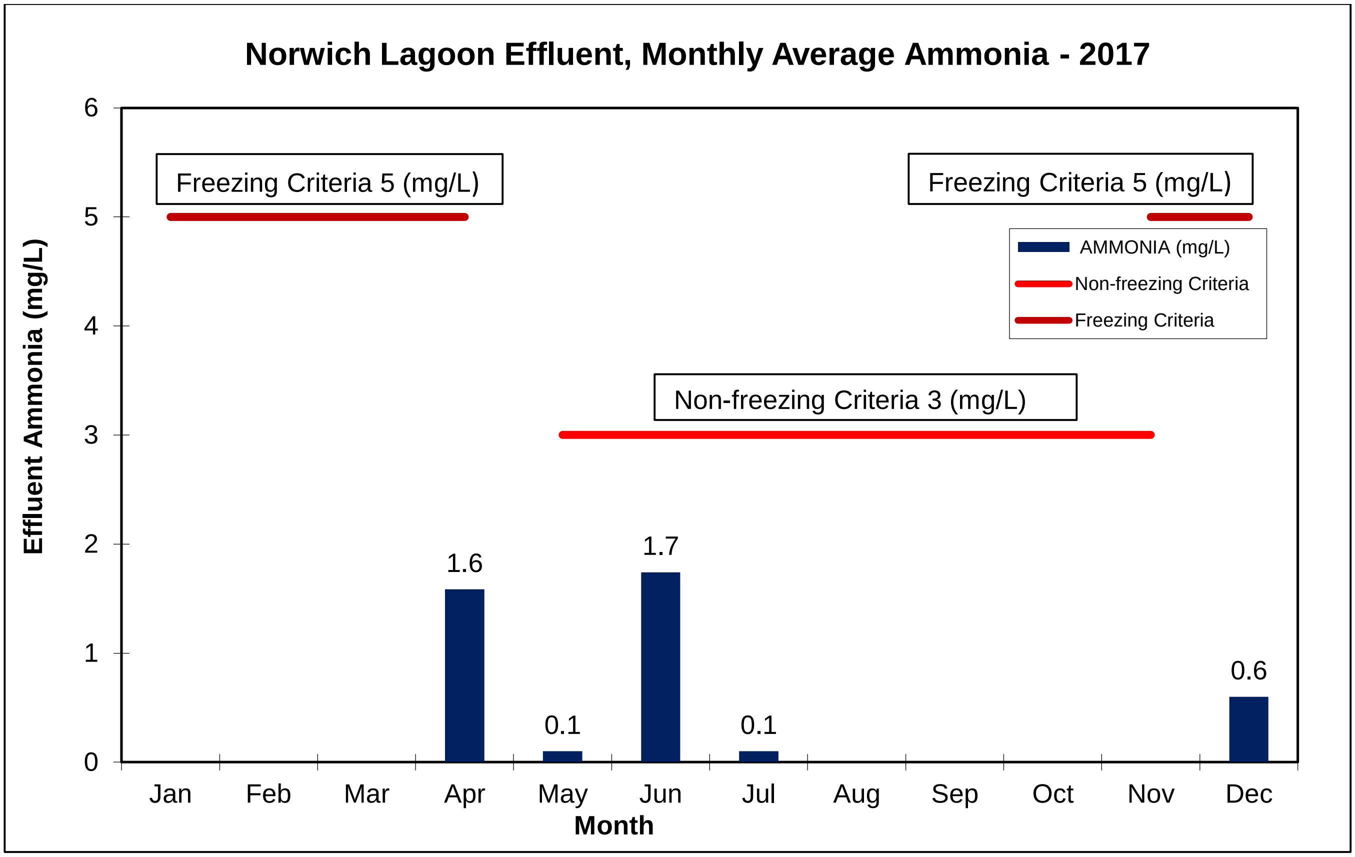
All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

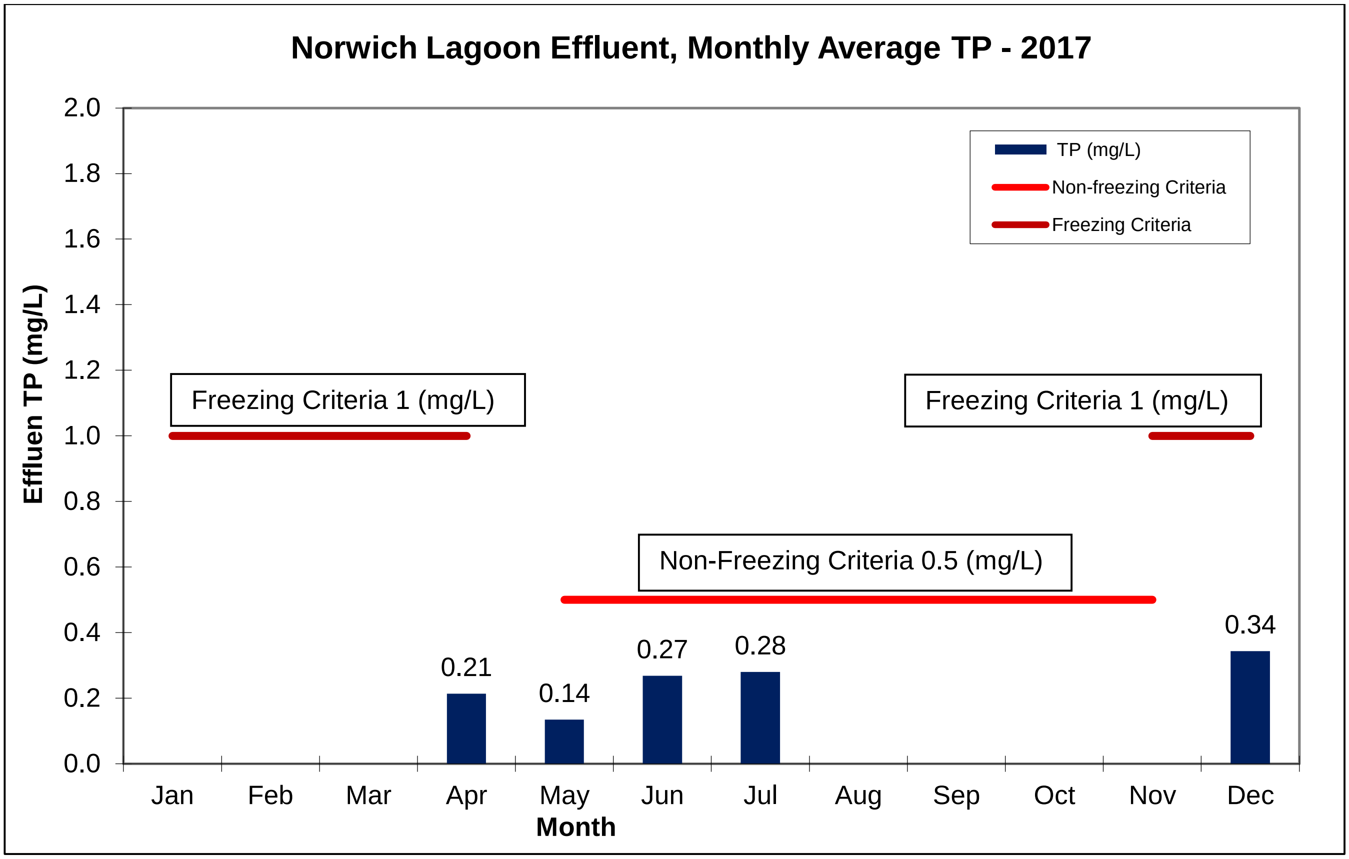
6. Biosolids 2017

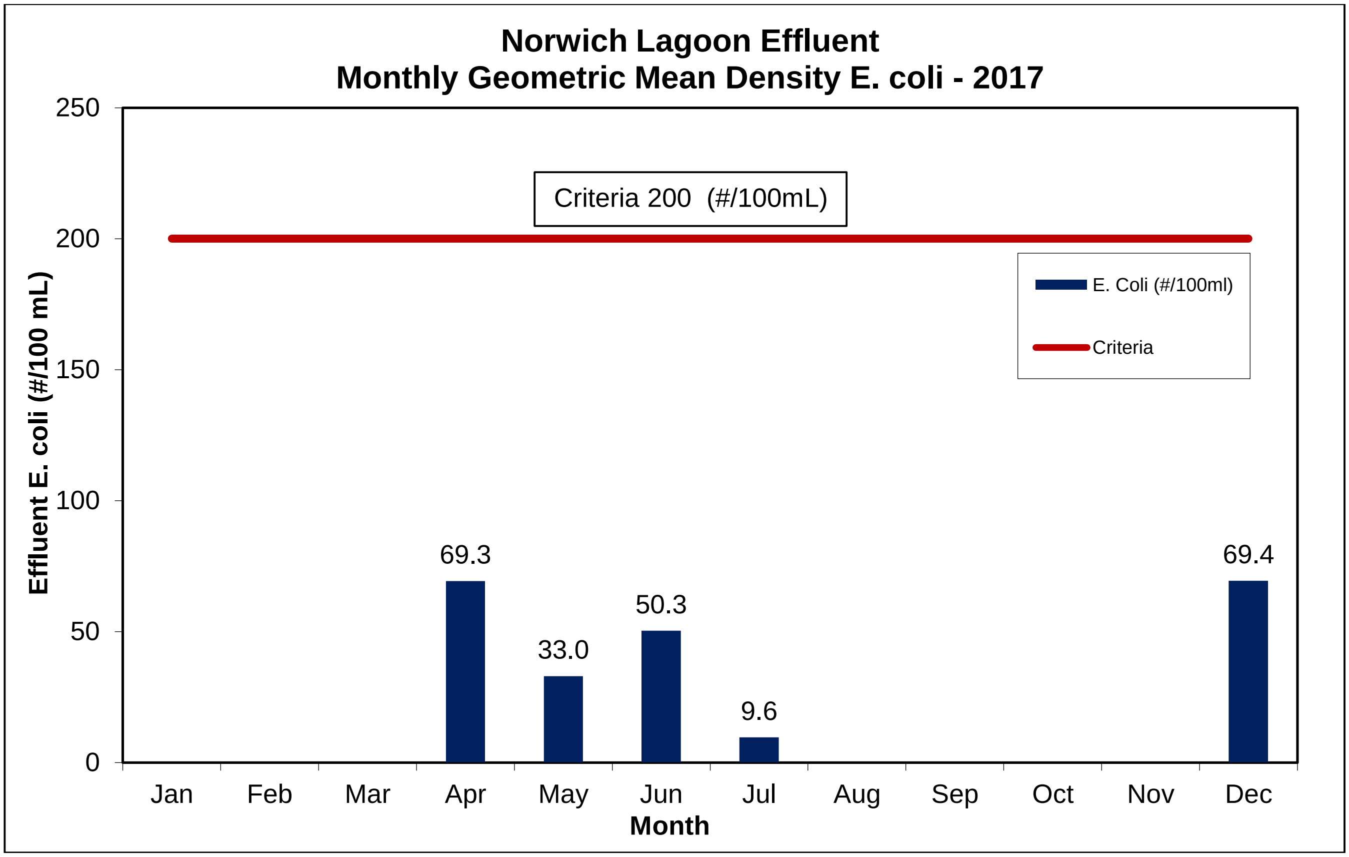
On cleaning out the Norwich Lagoons of biosolids it was necessary to receive permission of MOECC and OMAFRA to mix the material with our other biosolids so as to have adequate nutrients to use as a NASM for beneficial reuse. One thousand wet tonnes was moved into the BCSF for a trial in 2018 of blending and land application. It is anticipated that this will be an excellent use of the material and larger quantities will be removed from Cell 2 over the next three years.

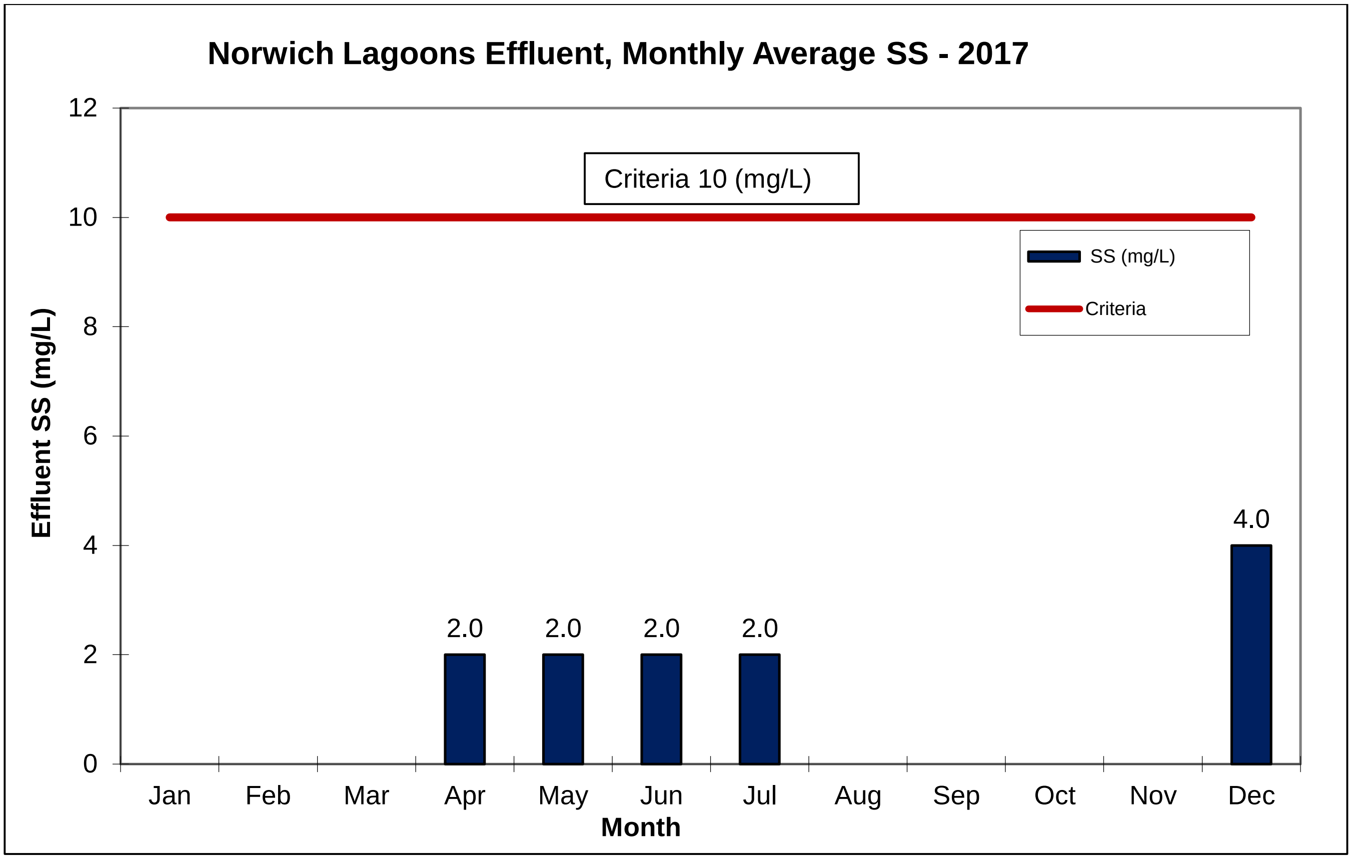
APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

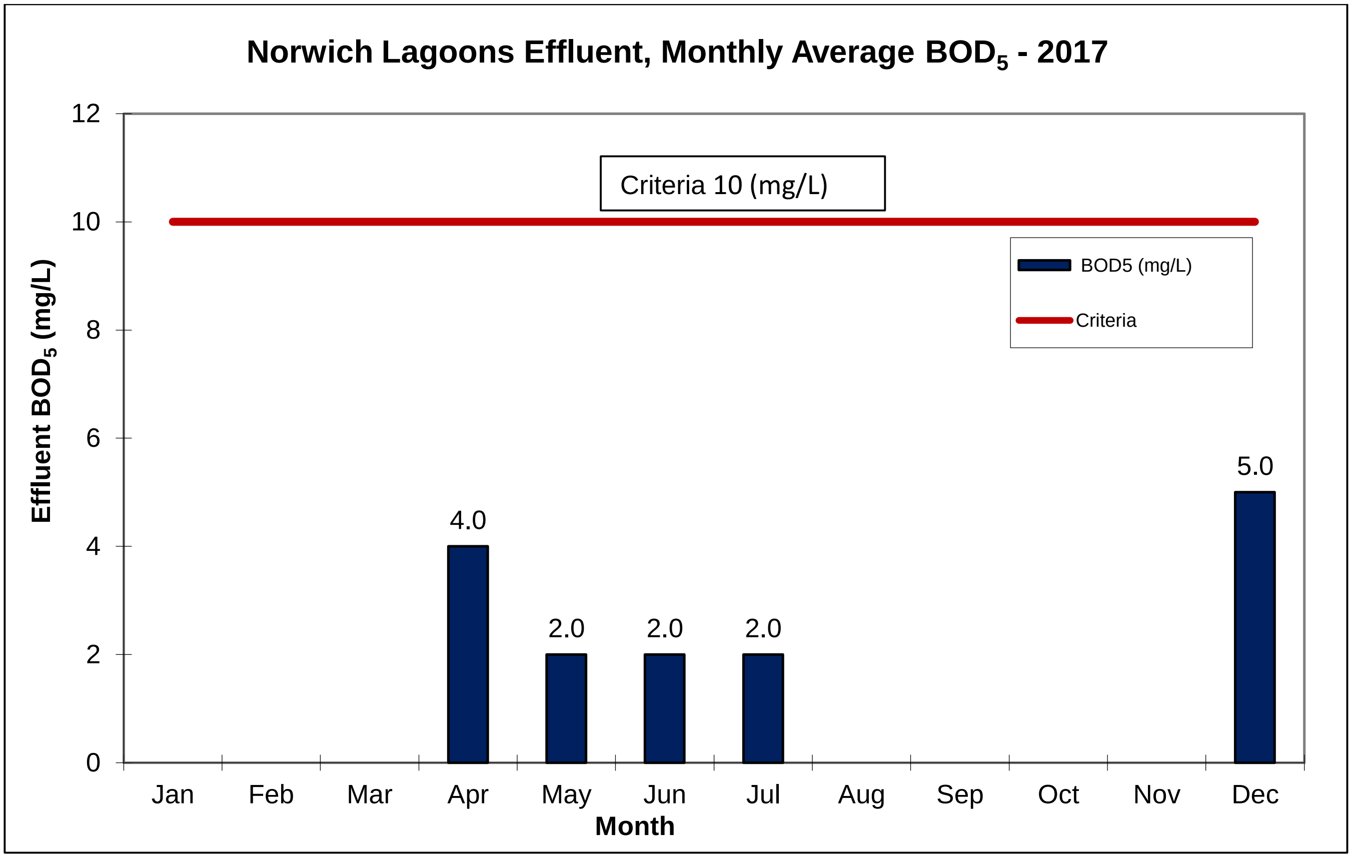

Norwich Lagoon Influent, Average Daily Flow (1000 m³/d) - 2017


Norwich Lagoon Effluent, Monthly Average Ammonia - 2017


Norwich Lagoon Effluent, Monthly Average TP - 2017
Effluen TP (mg/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
TP (mg/L)
Non-freezing Criteria
Freezing Criteria
Freezing Criteria 1 (mg/L)
Freezing Criteria 1 (mg/L)
Non-Freezing Criteria 0.5 (mg/L)
0.21
0.14
0.27
0.28
0.34
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Norwich Lagoon Effluent
Monthly Geometric Mean Density E. coli - 2017
Effluent E. coli (#/100 mL)
250
200
150
100
50
0
Criteria 200 (#/100mL)
E. Coli (#/100ml)
Criteria
69.3
33.0
50.3
9.6
69.4
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Norwich Lagoons Effluent, Monthly Average SS - 2017
Criteria 10 (mg/L)
SS (mg/L)
Criteria
Effluent SS (mg/L)
12
10
8
6
4
2
0
2.0
2.0
2.0
2.0
4.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Norwich Lagoons Effluent, Monthly Average BOD5 - 2017
Criteria 10 (mg/L)
BOD5 (mg/L)
Criteria
Effluent BOD5 (mg/L)
12
10
8
6
4
2
0
4.0
2.0
2.0
2.0
5.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Plattsville Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Plattsville Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110003022
Environmental Compliance Approval (ECA)	#3133-7QWH4N
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Plattsville WWTP is a Class I facility and provided effective wastewater treatment in 2017. Wastewater is treated at the Plattsville WWTP, which includes two aerated lagoon cells and two conventional wastewater stabilization ponds. Phosphorus removal is accomplished through the flow paced continuous dosing of aluminum sulphate into the splitter box prior to the wastewater entering the stabilization ponds and/or when required by batch dosing via a return pump pond mixing system, which can dose either cell and recirculate the contents. Treated effluent is pumped to an intermittent sand filter designed for ammonia removal prior to discharge to the Nith River.

The wastewater treatment plant is located at Lot 16, Conc. 12, Township of Blandford-Blenheim. The Facility description is provided below.

Facility	Plattsville Wastewater Treatment Plant
Design Capacity	800 m^3/d
2017 Average Daily Flow	503 m^3/d
2017 Maximum Daily Flow	1,147 m^3/d
2017 Total Volume of Wastewater	183,362 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Raw influent wastewater is sampled on a monthly basis and is analyzed for BOD_5, TSS, TKN, TP and pH. Effluent discharge samples are collected bi-weekly or monthly and at an interval to meet the percentage of drawdown of the lagoon cell as stipulated in the ECA during discharge periods and analyzed for $CBOD_5$, TSS, Total Ammonia Nitrogen, TP, E. coli, temperature and pH.

Laboratory and Field Testing

Laboratory analyses are performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house laboratory testing is done for process control and is not included in this report.

Groundwater Testing

The ECA requires that an annual groundwater sample be collected and tested for Total Organic Carbon, Total Phosphorus, Total Kjeldahl Nitrogen, Nitrite and Nitrate.

A further evaluation of the results over the last few years was conducted by a professional Hydrogeologist concluding that there was no clear evidence of an adverse effect on groundwater quality as a result of the Plattsville WWTP. This was forwarded to the MOECC to determine if further sampling is required.

Three samples were collected in 2017 and are referred to as the shallow well sample and deep well sample:

PLATTSVILLE WWTP GROUNDWATER SAMPLING						
	27-Apr-17	**27-Apr-17**	**9-May-17**	**9-May-17**	**21-Nov-17**	**21-Nov-17**
	Shallow	**Deep**	**Shallow**	**Deep**	**Shallow**	**Deep**
Parameter						
TOC (mg/L)	1	1	< 1	2	2	1
Total P (mg/L)	< 0.03	0.06	< 0.03	0.1	0.09	0.37
TKN (mg/L N)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ammonia/ium (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrite (mg/L)	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (mg/L)	0.23	0.06	0.23	< 0.06	0.2	< 0.06
Nitrate + Nitrite (mg/L N)	0.23	0.06	0.23	< 0.06	0.2	< 0.06
Chloride (mg/L)	4	21	4	20	4	20

2.2. Plant Performance & Effluent Quality

The Plattsville WWTP provided effective treatment in 2017 meeting all its regulatory limits for all parameters in the effluent discharged to the Nith River.

On a bi-weekly basis (as a minimum) the operator measures pH of the effluent streams during discharge. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2017.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD_5	175	88
Total Suspended Solids	185	93
Total Phosphorus	4.9	2.5
Total Kjeldahl Nitrogen	46.1	22.6

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
$CBOD_5$	weekly	10	2 – 4.8	97.3 - 98.9
Total Suspended Solids	weekly	10	2 – 7.8	95.8 - 98.9
Total Phosphorus	weekly	0.5	0.01 – 0.07	98.6 - 99.8
Total Ammonia Nitrogen (when receiving stream >12 degrees Celsius)	weekly	2	0.1 – 0.1	99.8
Total Ammonia Nitrogen (when receiving stream < or = to 12 degrees Celsius)	weekly	5	0.1 – 0.5	98.8 - 99.8
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2 – 15 organisms/100 mL	--
pH any single sample	weekly	6.0-9.5	6.9 – 7.8	--

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met with the exception of four single sample exceedances, summarized in the table below. In addition, the monthly average concentration for Total Suspended Solids in November of 7.8 mg/L, had exceeded the corresponding objective limit of 5 mg/L.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	5	2 – 4.8
Total Suspended Solids	weekly	5	2 – 7.8
Total Phosphorus	weekly	0.3	0.01 – 0.07
Total Ammonia Nitrogen (when receiving stream >12 degrees Celsius)	weekly	1	0.1 – 0.1
Total Ammonia Nitrogen (when receiving stream < or = to 12 degrees Celsius)	weekly	3	0.1 – 0.5

E. coli (May 1 – October 31)	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	2 – 15 organisms/100 mL

Plattsville effluent single sample objective exceedances in 2017 included the following:

Month	Parameter	Objective (mg/L)	Result (mg/L)
Nov 14	TSS	5	16
Nov 21	TSS	5	6
Nov 24	TSS	5	7
Nov 24	CBOD	5	12

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypassing, upsets, spills, and abnormal conditions from the Plattsville WWTP in 2017.

On September 11, 2017 there was a leak of approximately 5 m^3 of wastewater from the Plattsville sewage forcemain due to a break. The spill was contained and all impacted soil removed off-site and the break was fixed.

This event was reported to the MOECC at the time it occurred and no further action was required.

4. Maintenance of Works

The operating and maintenance staff at the Plattsville WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by Flowmetrix Technical Services Inc. The operational monitoring equipment calibration records are kept on-site at the Plant.

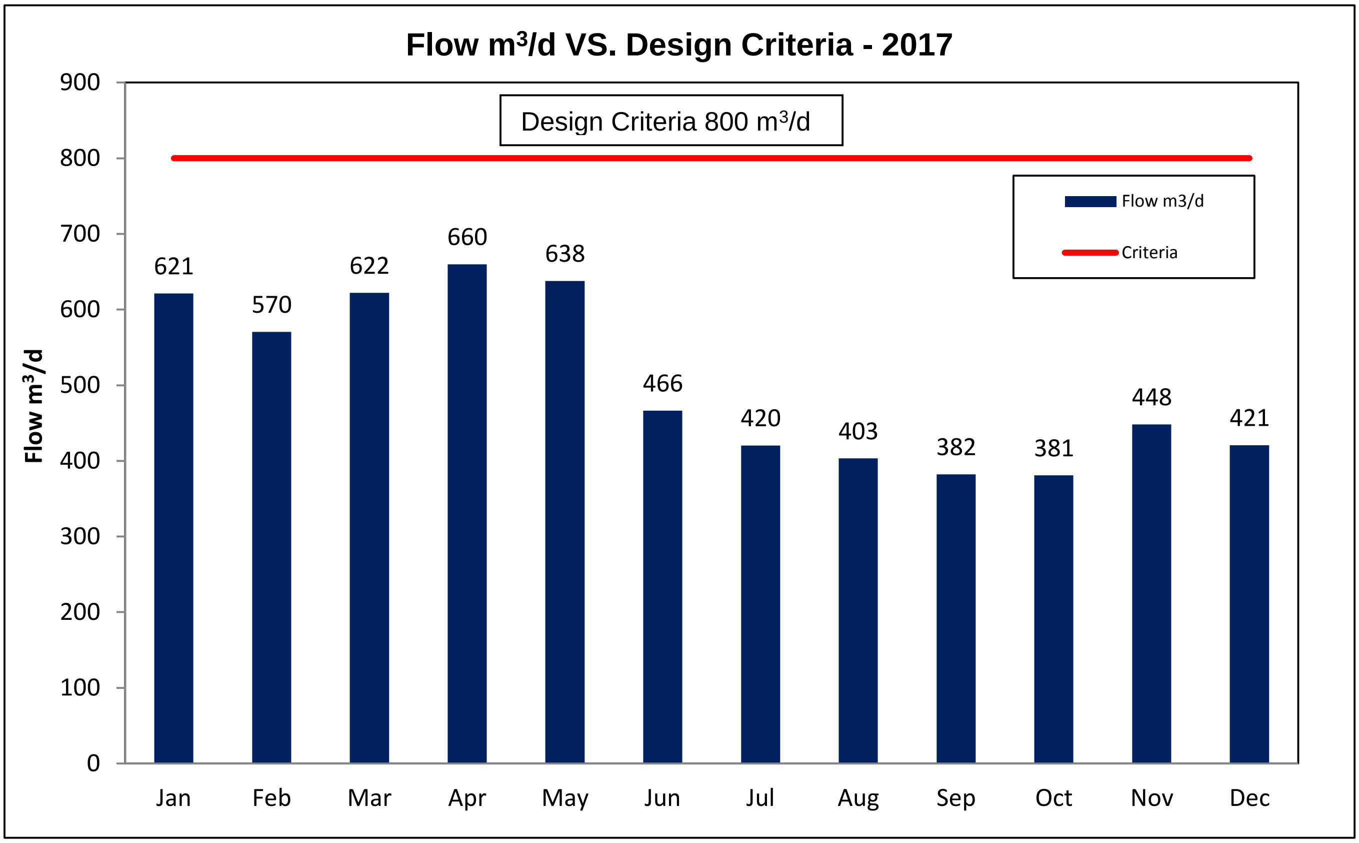
6. Audits, Pilots, and Trials

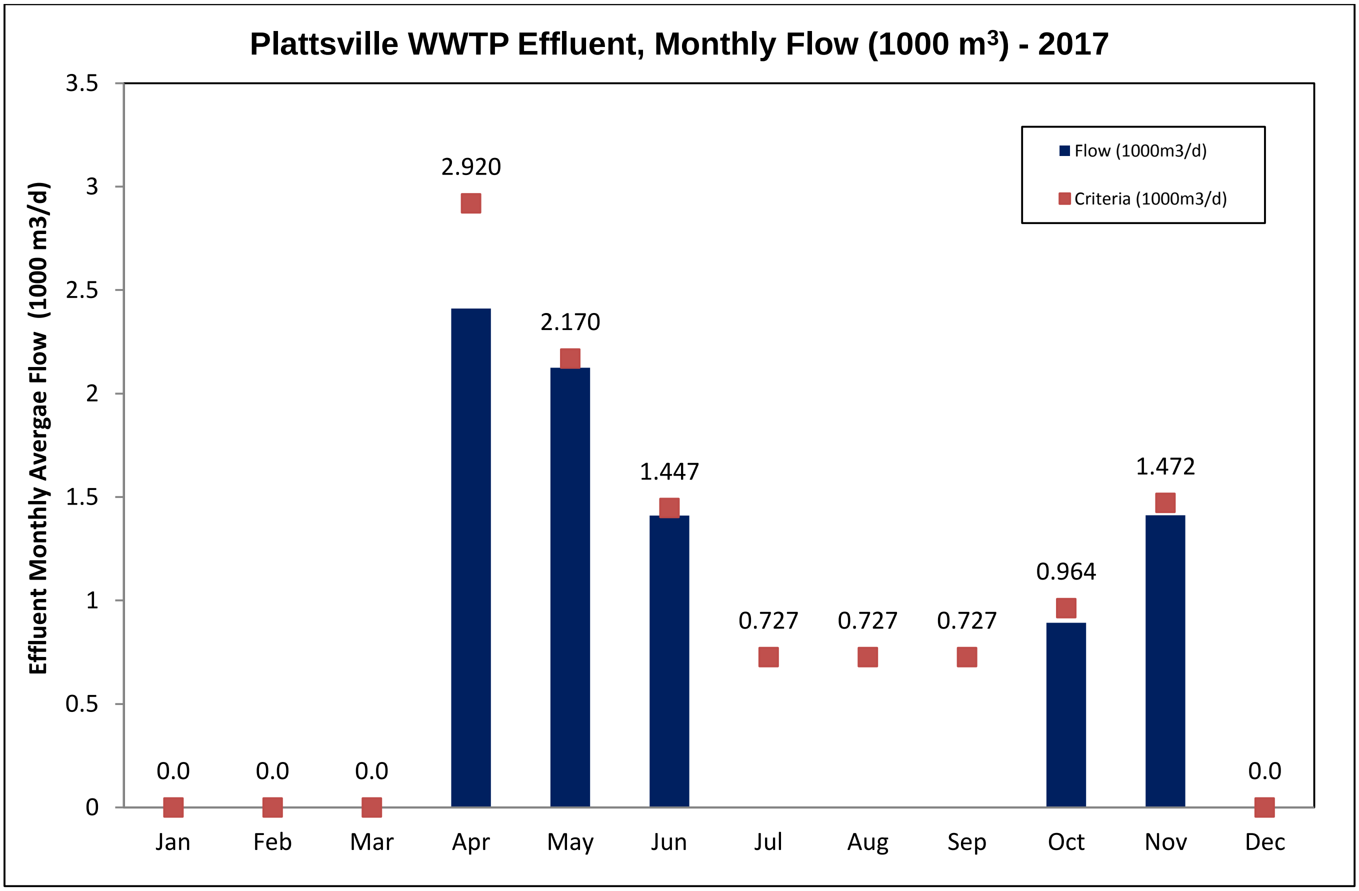
There was no MOECC audit in 2017.

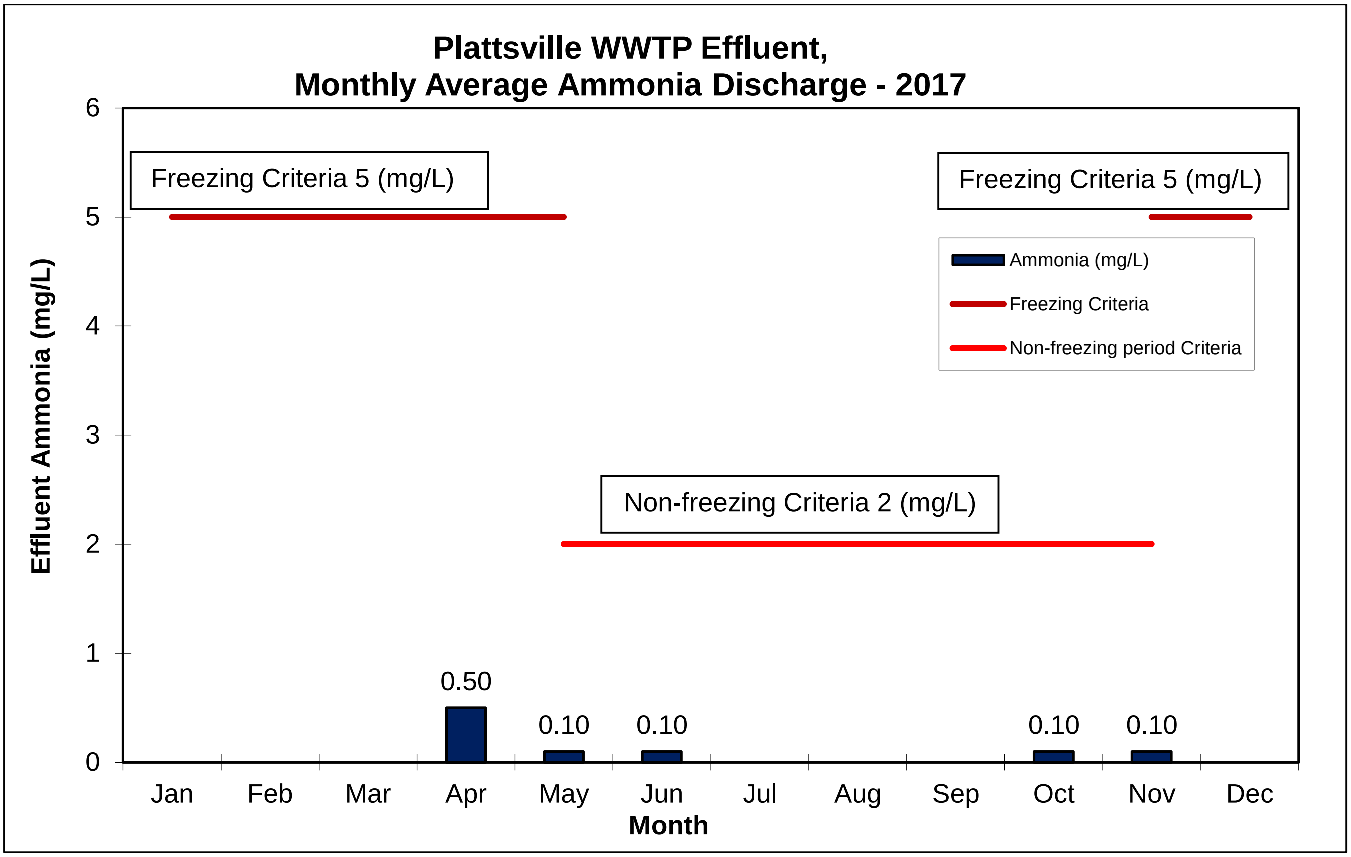
The plant was included in the Annual Watershed WWTP Performance Report of the Grand River Conservation Authority (GRCA) and the Plattsville Lagoons continue to be a strong performer amongst the wastewater plants along the Grand River System. The staff have participated in the optimization and composite correctional program (CCP) initiatives of the GRCA. The CCP system was applied to our Plattsville facility which is novel as it was not designed for lagoons.

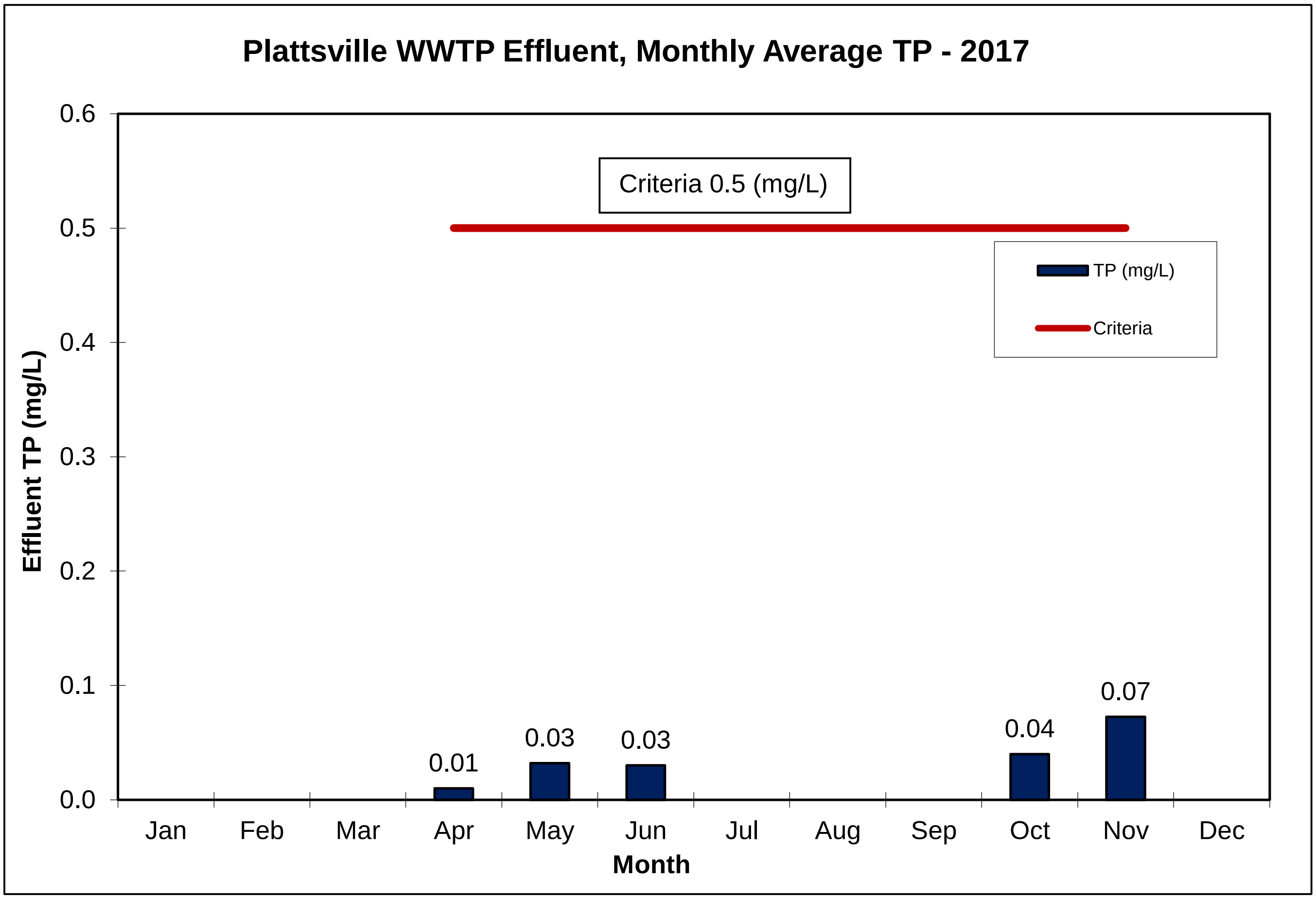
Oxford County continues to supply data voluntarily and sit with the wastewater group at their regular meetings at the GRCA.

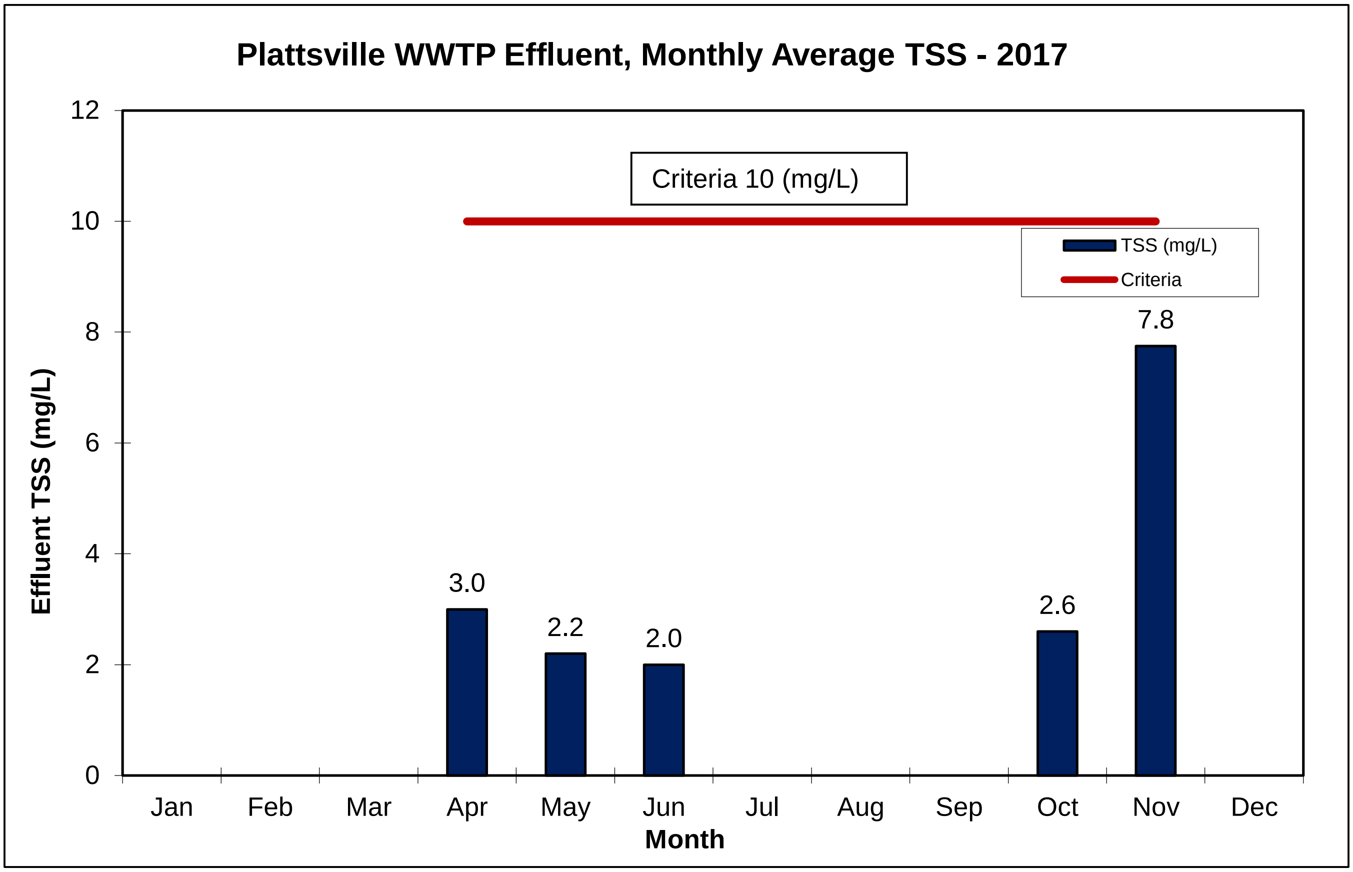
APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

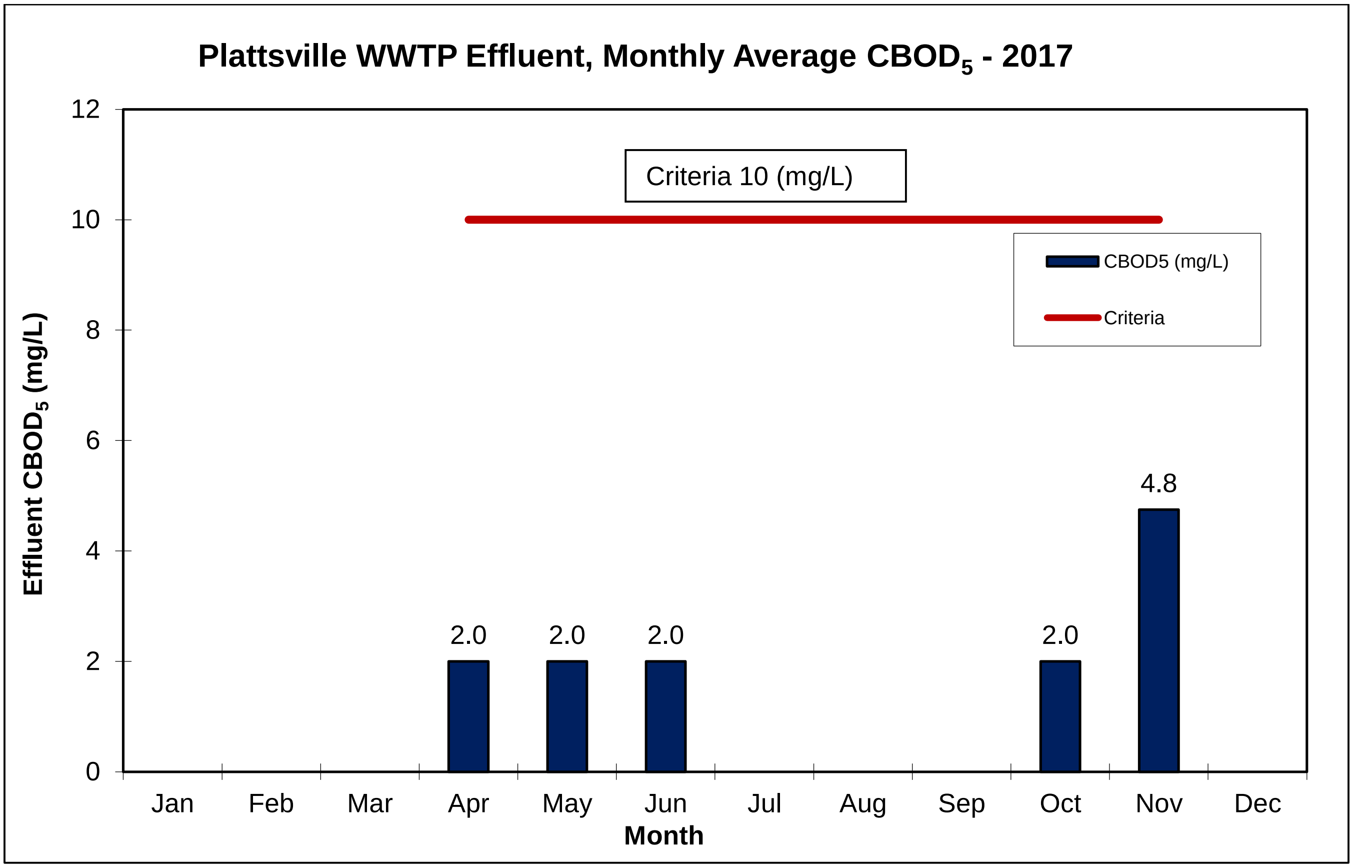





Plattsville WWTP Effluent,
Monthly Average Ammonia Discharge - 2017
Effluent Ammonia (mg/L)
6
5
4
3
2
1
0
Freezing Criteria 5 (mg/L)
Freezing Criteria 5 (mg/L)
Ammonia (mg/L)
Freezing Criteria
Non-freezing period Criteria
Non-freezing Criteria 2 (mg/L)
0.50
0.10
0.10
0.10
0.10
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Plattsville WWTP Effluent, Monthly Average TP - 2017
Effluent TP (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Criteria 0.5 (mg/L)
TP (mg/L)
Criteria
0.01
0.03
0.03
0.04
0.07
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Plattsville WWTP Effluent, Monthly Average TSS - 2017
Criteria 10 (mg/L)
TSS (mg/L)
Criteria
Effluent TSS (mg/L)
12
10
8
6
4
2
0
3.0
2.2
2.0
2.6
7.8
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Plattsville WWTP Effluent, Monthly Average CBOD$_5$ - 2017
Criteria 10 (mg/L)
CBOD5 (mg/L)
Criteria
Effluent CBOD$_5$ (mg/L)
12
10
8
6
4
2
0
2.0
2.0
2.0
2.0
4.8
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Tavistock Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Tavistock Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110000720
Environmental Compliance Approval (ECA)	#7789-8AKJL5
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Tavistock WWTP is a Class I facility and provided effective wastewater treatment in 2017. The Tavistock WWTP consists of 3 aerated lagoon cells, one polishing pond and an Intermittent Sand Filter (ISF). The first three cells are equipped with Mat Aerators, and there are an additional six 15 HP aspirating surface aerators in Cell 1 to provide the necessary dissolved oxygen for the lagoons.

There is also the provision for continuous aluminum sulphate addition for phosphorus removal. The wastewater is dosed with aluminum sulphate as it enters Cell 1 and as it enters Cell 2.

Effluent from Cell 1 overflows to Cell 2, then into Cell 3 and/or Cell 4 where it is pumped through the filter beds and/or stored prior to discharge.

The wastewater treatment plant is located at 381 William St., Tavistock, Ontario. The Facility description is provided below.

Facility	Tavistock Wastewater Treatment Plant
Design Capacity	2,525 m^3/d
2017 Average Daily Flow	2,006 m^3/d
2017 Maximum Daily Flow	6,876 m^3/d

2017 Total Volume of Wastewater	732,346 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Raw sewage is sampled a minimum of once monthly for $CBOD_5$, suspended solids, TKN, total phosphorous, pH and temperature.

Automatic composite samplers are used to collect raw sewage samples from Chamber 3 as the flow enters Cell 1. Automated composite samples are also taken at the same time from a large food processor in Tavistock. The company can discharge significant loadings to the Tavistock Lagoon system and is subject to a surcharge agreement with Oxford County.

Grab samples of final effluent are taken weekly during effluent discharge and tested for $CBOD_5$, suspended solids, total phosphorous, pH, temperature, dissolved oxygen, nitrate nitrogen, nitrite nitrogen and ammonia nitrogen.

Laboratory and Field Testing

SGS Lakefield Research Ltd. performs all sample analyses with the exception of pH, temperature, and dissolved oxygen which are measured in the field.

2.2. Plant Performance & Effluent Quality

The Tavistock WWTP provided effective treatment in 2017, meeting all its regulatory limits for all parameters in the effluent discharged to the Hohner Drain (eventually to the Thames River).

On a weekly basis (minimum), the operator measures pH of the effluent stream when discharging. There was no single pH result for the effluent outside the discharge limit of 6 – 9.5 in 2017.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
$CBOD_5$	456	915
Total Suspended Solids	282	566
Total Phosphorus	12	24
Total Kjeldahl Nitrogen	28.5	57

Effluent Parameter	Sample Frequency	ECA Effluent Limit (Monthly Average) (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)	Percentage Removal
$CBOD_5$	weekly	15	2.0 – 5.0	98.9 - 99.6
Suspended Solids	weekly	15	2.0 – 8.8	96.9 - 99.3
Total Phosphorus (May-Nov.)	weekly	0.5	0.09 – 0.15	98.8 - 99.3
Total Phosphorus (Dec.-Apr.)	weekly	0.8	0.10 – 0.28	97.7 - 99.2
Total Ammonia Nitrogen (January)	weekly	7	–	–
Total Ammonia Nitrogen (February)	weekly	10	1.2	–
Total Ammonia Nitrogen (March)	weekly	8.5	0.7	–
Total Ammonia Nitrogen (April)	weekly	8.0	0.1	–
Total Ammonia Nitrogen (May-Nov.)	weekly	1.0	0.1	–
Total Ammonia Nitrogen (December)	weekly	3.0	0.3	–
pH any single sample	weekly	6.0 - 9.5	6.9 – 8.8	–

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Tavistock WWTP in 2017, with the exception of two single sample objective failures for Total Suspended Solids (TSS), one on March 7 and the other on March 14, with a value of 15 mg/L for both samples, when the objective is set at 10 mg/L. The monthly average concentration for TSS for the month of March was 8.8 mg/L.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	Sample Frequency	Monthly Average Objective Concentration (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	10	2.0 – 5.0
Suspended Solids	weekly	10	2.0 – 8.8
Total Phosphorus (May-Nov.)	weekly	0.3	0.09 – 0.15
Total Phosphorus (Dec.-Apr.)	weekly	0.5	0.10 – 0.28
Total Ammonia Nitrogen (January)	weekly	6.0	–
Total Ammonia Nitrogen (February)	weekly	9.0	1.2
Total Ammonia Nitrogen (March)	weekly	7.5	0.7
Total Ammonia Nitrogen (April)	weekly	7.0	0.1
Total Ammonia Nitrogen (May-Nov.)	weekly	0.8	0.1
Total Ammonia Nitrogen (December)	weekly	1.5	0.3
pH any single sample	weekly	6.5 - 9.0	6.9 – 8.8

3. Overflows, Bypassing, Upsets, Spills, Complaints, and Abnormal Conditions

There were no overflows, bypasses, upsets, spills, complaints, or abnormal conditions from the Tavistock WWTP in 2017.

4. Maintenance of Works

The operating and maintenance staff at the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

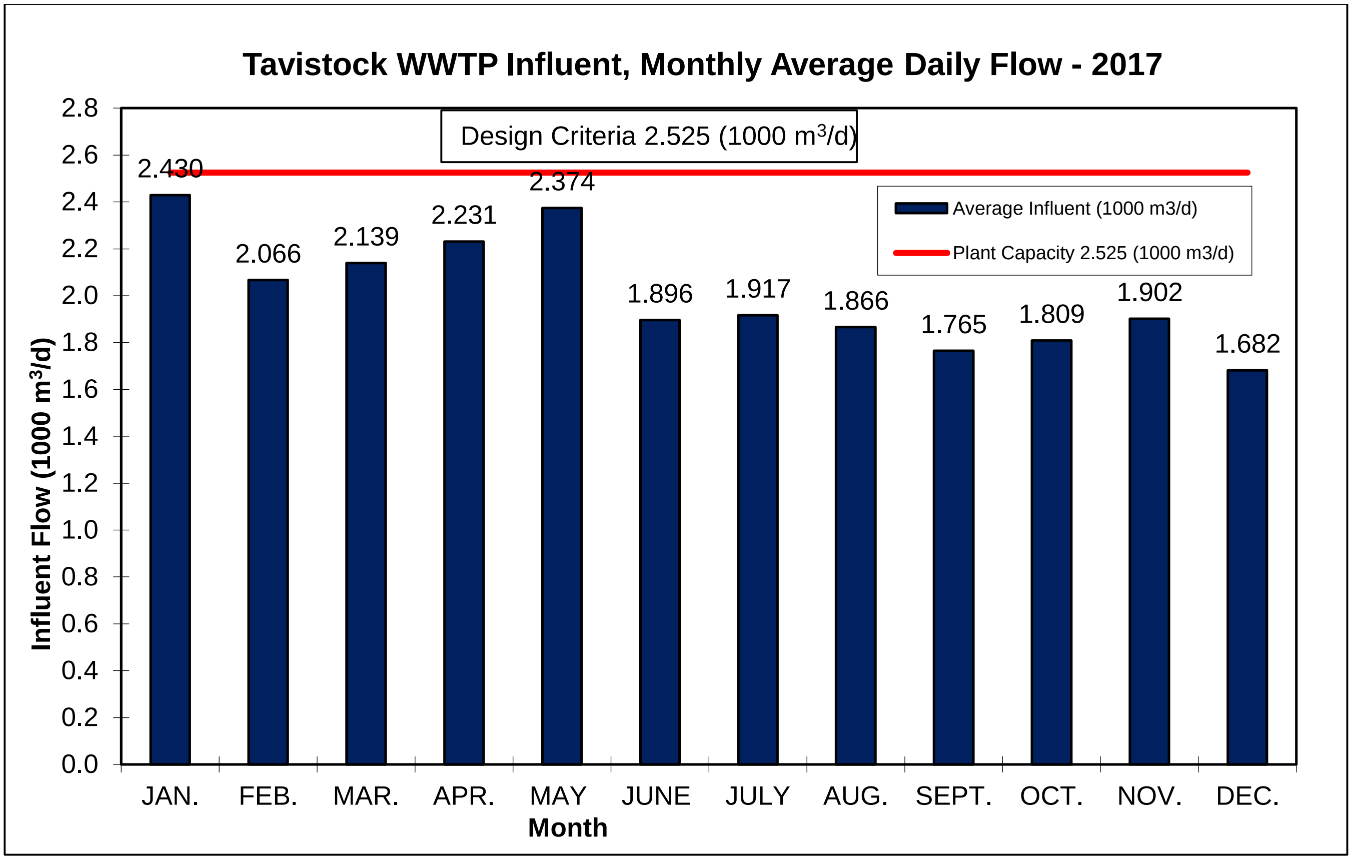
5. Monitoring Equipment Maintenance and Calibration

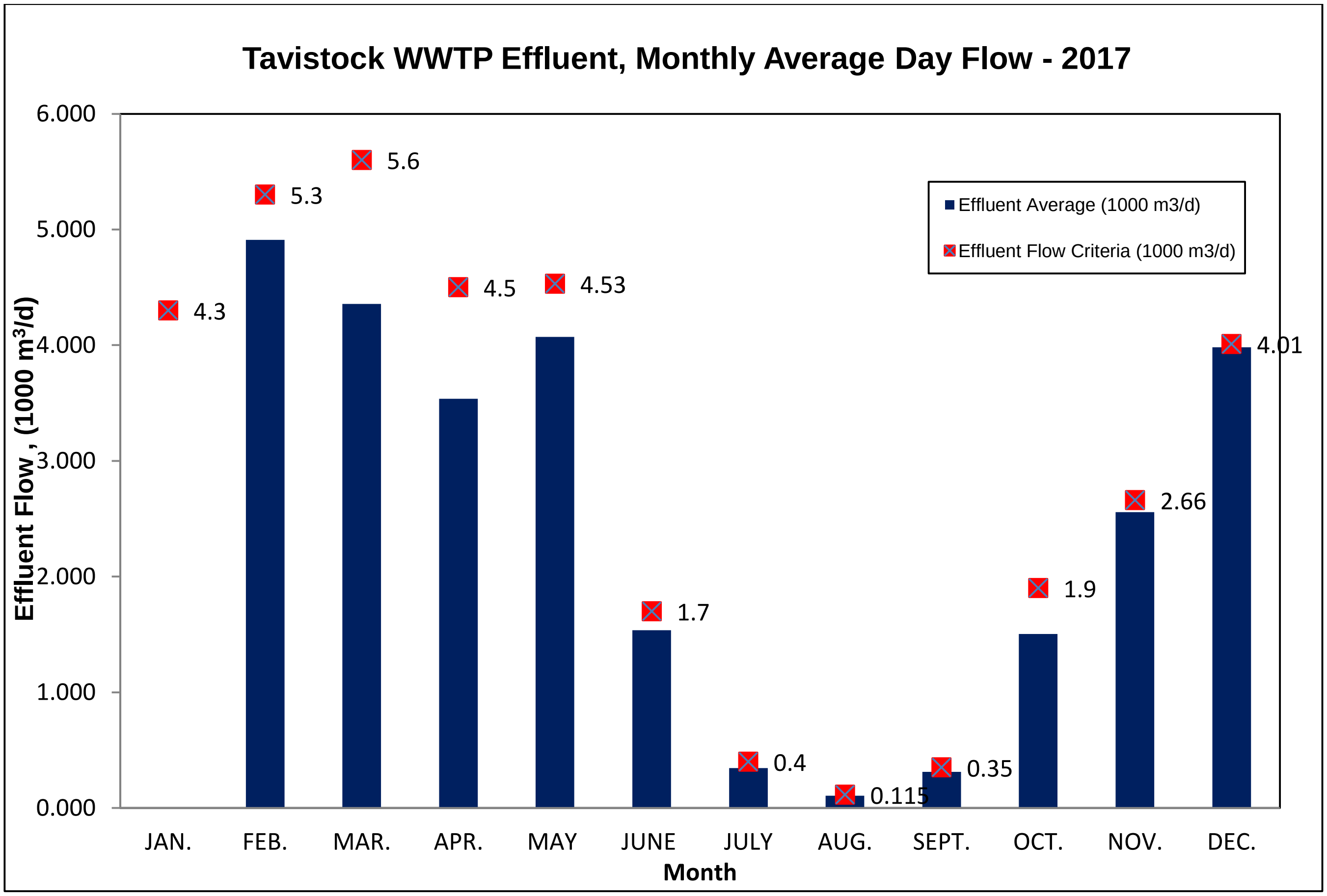
Calibration of flow meters is conducted yearly by Flowmetrix Technical Services Inc. The operational monitoring equipment calibration records are kept on-site at the Plant.

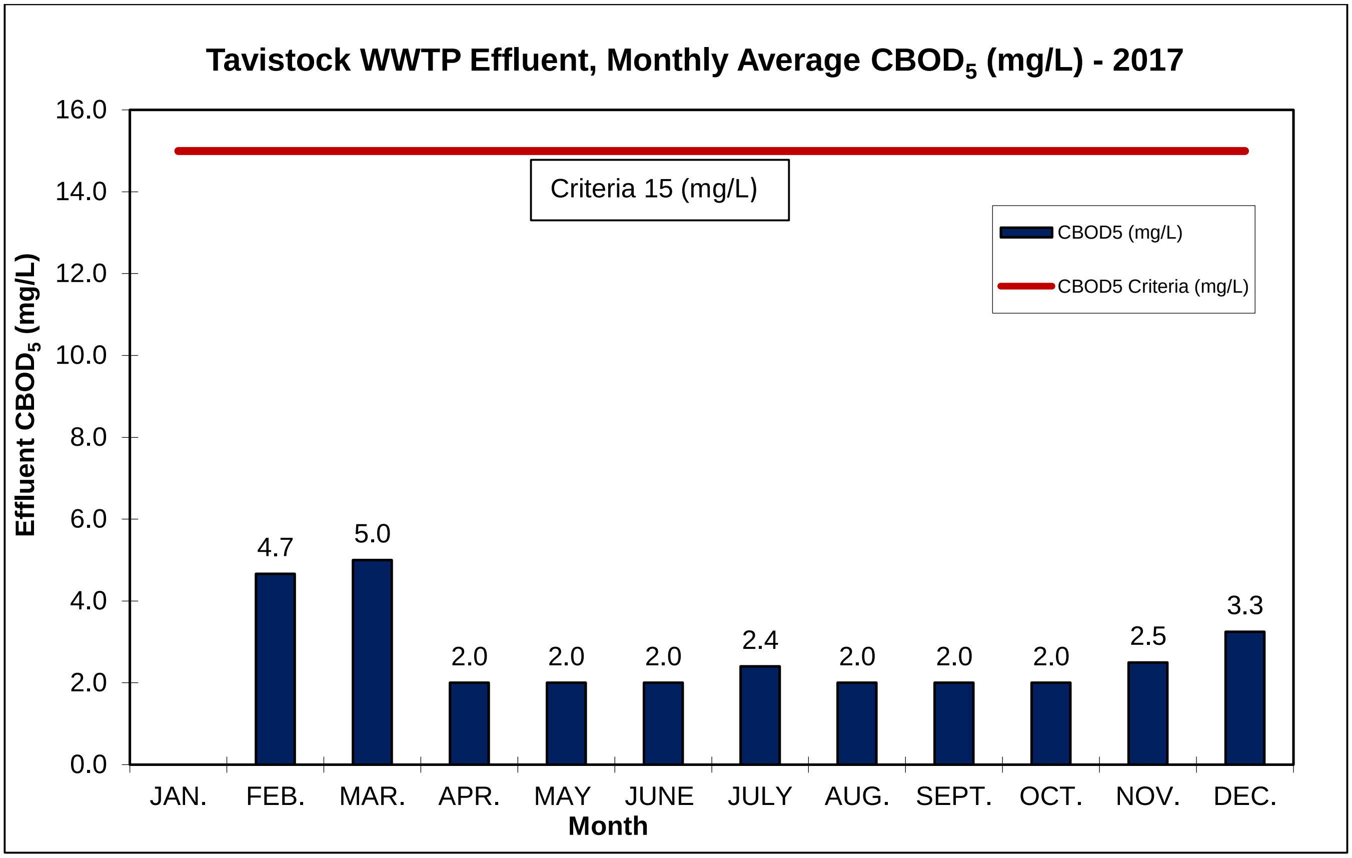
6. Audits, Pilots, and Trials

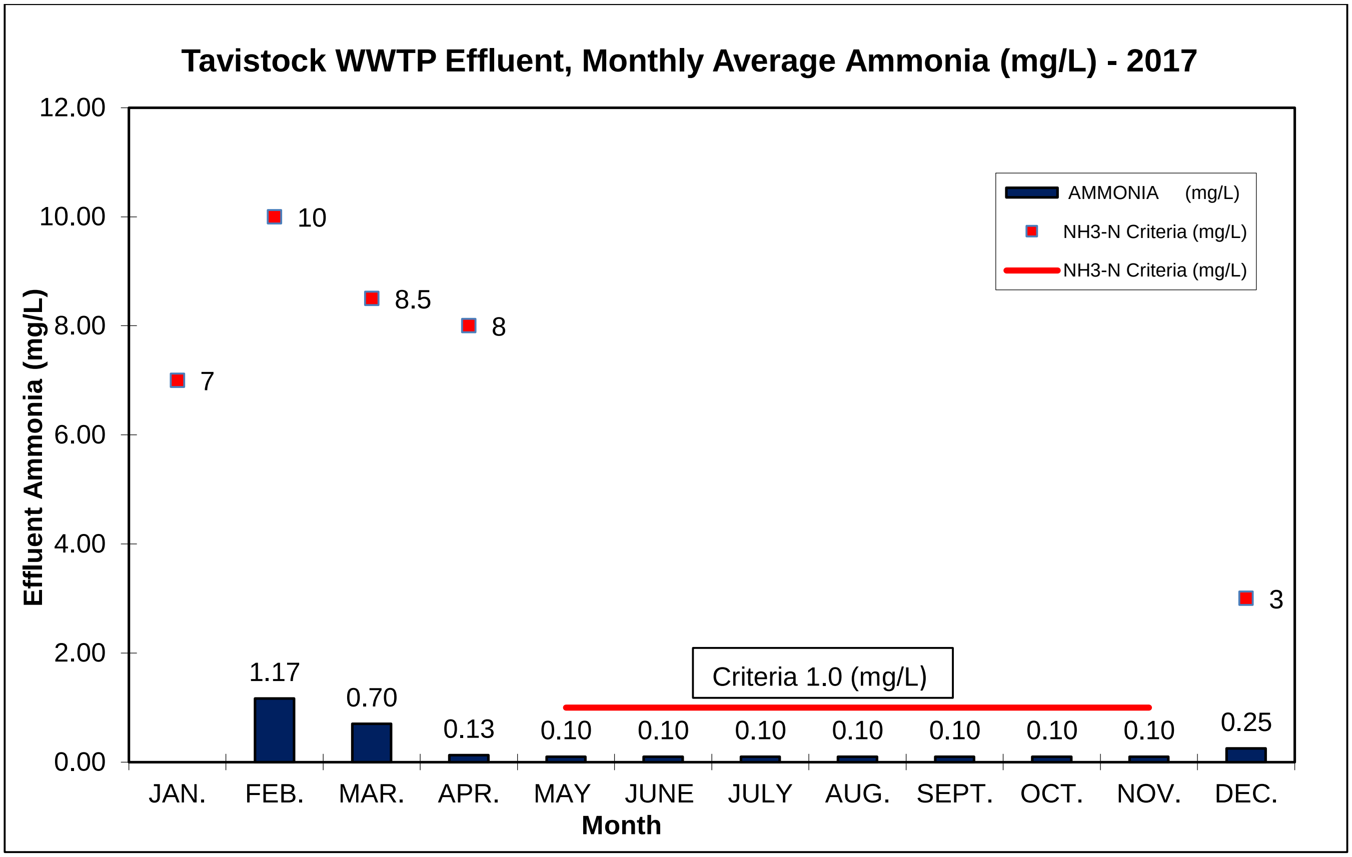
There was no MOECC Audit in 2017.

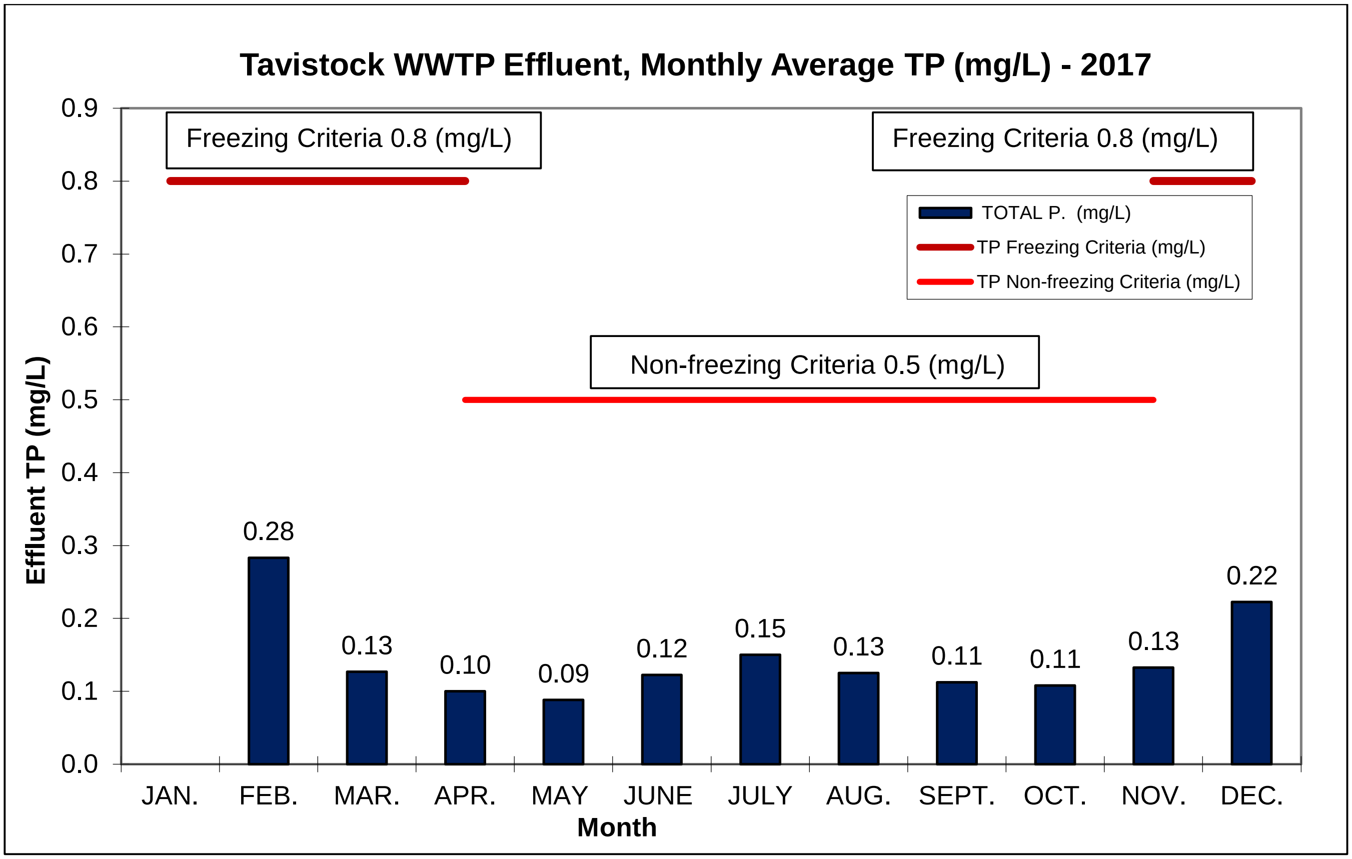
APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

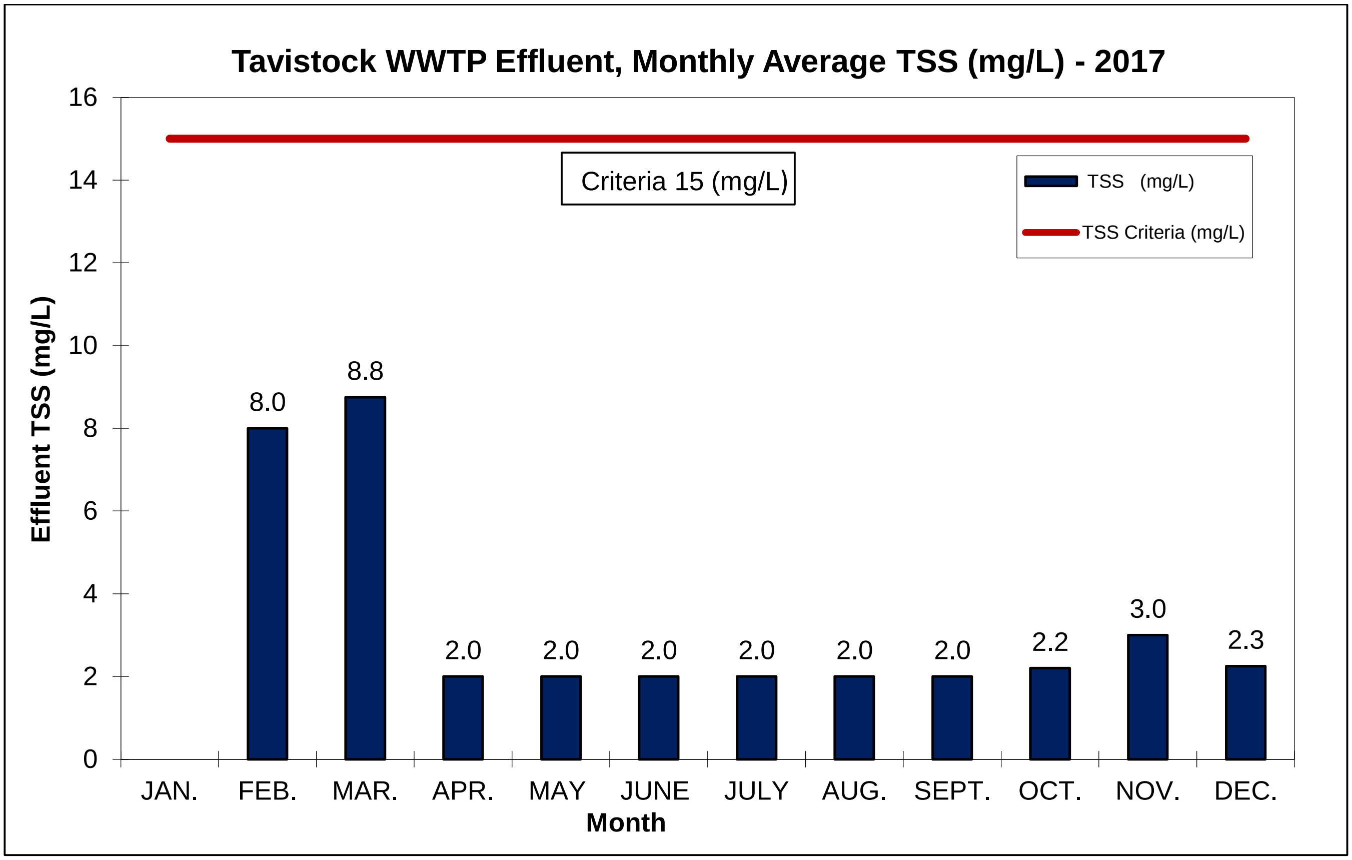





Tavistock WWTP Effluent, Monthly Average CBOD$_5$ (mg/L) - 2017
Effluent CBOD$_5$ (mg/L)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Criteria 15 (mg/L)
CBOD5 (mg/L)
CBOD5 Criteria (mg/L)
4.7
5.0
2.0
2.0
2.0
2.4
2.0
2.0
2.0
2.5
3.3
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month


Tavistock WWTP Effluent, Monthly Average Ammonia (mg/L) - 2017
Effluent Ammonia (mg/L)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
AMMONIA (mg/L)
NH3-N Criteria (mg/L)
NH3-N Criteria (mg/L)
7
10
8.5
8
3
Criteria 1.0 (mg/L)
1.17
0.70
0.13
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.25
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month


Tavistock WWTP Effluent, Monthly Average TP (mg/L) - 2017
Freezing Criteria 0.8 (mg/L)
Freezing Criteria 0.8 (mg/L)
TOTAL P. (mg/L)
TP Freezing Criteria (mg/L)
TP Non-freezing Criteria (mg/L)
Non-freezing Criteria 0.5 (mg/L)
Effluent TP (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.28
0.13
0.10
0.09
0.12
0.15
0.13
0.11
0.11
0.13
0.22
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month


Tavistock WWTP Effluent, Monthly Average TSS (mg/L) - 2017
Criteria 15 (mg/L)
TSS (mg/L)
TSS Criteria (mg/L)
Effluent TSS (mg/L)
16
14
12
10
8
6
4
2
0
8.0
8.8
2.0
2.0
2.0
2.0
2.0
2.0
2.2
3.0
2.3
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month

2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Thamesford Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Thamesford Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120002601
Environmental Compliance Approval (ECA)	#6974-6FKKAY & 1897-9YAKKF
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Thamesford Wastewater Treatment Plant (WWTP) is a Class III facility and provided effective wastewater treatment in 2017 for residential, commercial, and industrial users in the Village of Thamesford. The Thamesford WWTP is an extended air activated sludge plant equipped with tertiary sand filters and receives significant wastewater flows from a local major food processing plant; however, the treatment plant also receives domestic wastewater from the Community of Thamesford. The wastewater from the processing plant is collected from various on-site business units and pumped to a pretreatment system comprised of an equalization silo and a Dissolved Air Flotation (DAF) unit. Following pre-treatment the wastewater is directed to the municipal WWTP.

The extended aeration system is comprised of two tanks: the complete mix basin and the plug flow reactor. After the plug flow reactor, the wastewater flows into one of two clarifiers where the settled activated sludge is either returned or wasted and the supernatant flows to new sand filters, prior to disinfection and direct discharge to the Middle Thames River. Wasted biosolids are processed/stabilized in two aerobic digesters, and held on-site in a storage tank for eventual removal. Biosolids are applied to agricultural land application sites with appropriate Nutrient Management Plans for Non-Agricultural Source Material (NASM).

For purposes of calculating loading to the River, the treated effluent flow is measured at the Parshall flume located after the stilling well just before discharge to the re-aeration chamber and the Middle Thames River. The flow readings used to apportion the loading to the plant is from two meters: one on each lift station. The influent and all other meters are calibrated annually.

A standby generator is available to run the onsite lift stations and a blower in the event of a power failure. The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The wastewater treatment plant is located at 10 Middleton St., Thamesford, Ontario. The Facility description is provided below.

Facility	Thamesford Wastewater Treatment Plant
Design Capacity	2,500 m^3/d
2017 Average Daily Flow	1,297 m^3/d
2017 Maximum Daily Flow	2,225 m^3/d
2017 Total Volume of Wastewater	473,193 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples were taken from sampling ports located in-line after the influent pumps. Two 24-hour composite samplers take a sample every 15 minutes for a 24-hour period concurrent with effluent sampling. A sampler is installed on each of the municipal and the food processing company's influent lines. The two influent streams are separately tested, and then the results are mathematically combined, based on flow ratios.

In 2017, effluent samples were taken using a 24-hour composite sampler set to take a sample every 15 minutes for 24 hours. Samples were drawn from a stilling well prior to the Parshall flume immediately before the discharge. Total residual chlorine (TRC) samples are taken daily from the stilling well prior to the Parshall flume. The stilling well follows the chlorination and de-chlorination chambers. The pH of the final effluent composite sample is also measured.

Following the Parshall flume, effluent flows through a discharge pipe and drops approximately 0.75 m into a discharge well, where dissolved oxygen (DO) samples are taken. This discharge well aerates the effluent prior to discharge to the River, as reflected in the DO sample results.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples, except for TRC, DO, and pH which are tested in the field. These results are used for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

2.2. Plant Performance & Effluent Quality

The Thamesford WWTP provided effective treatment in 2017 meeting all its regulatory limits for all parameters in the effluent discharged to the Thames River with the exception of one Chlorine residual over the limit of 0.02 mg/L, details are under section 3 below.

There was no single laboratory pH result for the effluent outside the discharge limit of 6 - 9.5 in 2017.

Staff tests Total Residual Chlorine (TRC) in the treated effluent on a daily basis; well in excess of the required weekly testing frequency. In 2017, the monthly average results at all times met the Monthly Average TRC limit of 0.02 mg/L or less and, therefore, were in compliance.

The Thamesford WWTP met all its effluent loading limits required within the ECA.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD_5	301	390
Total Suspended Solids	155	201

Total Phosphorus	6.2	8
Total Kjeldahl Nitrogen	55.3	72
Oil and Grease	21	27

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
BOD_5 (May 01 to November 30)	weekly	10	2.0 – 2.5	99.2 – 99.3
BOD_5 (December 01 to April 30)	weekly	15	2.0 – 2.8	99.1 – 99.3
Total Suspended Solids (May 01 to November 30)	weekly	10	2.0	98.7
Total Suspended Solids (December 01 to April 30)	weekly	15	2.0 – 2.8	98.2 – 98.7
Total Phosphorus (May 01 to November 30)	weekly	0.20	0.1	98.4
Total Phosphorus (December 01 to April 30)	weekly	0.50	0.06 – 0.12	98.1 – 99.0
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.1	--
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	5.0	0.1	--
Total Chlorine Residual	weekly	0.02	0.00 – 0.02	--
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	1 – 82 organisms/100 mL	--
pH any single sample	weekly	6.0 - 9.5	6.55 – 7.68	--
Dissolved Oxygen	weekly	5 and above	6.1 – 10.2	--

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant’s ECA were met with the exception of 4 single sample results for TP above the objective of 0.1 mg/L. In addition, we are unable to declare a non-detect on TRC. The results are summarized below.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
BOD_5	weekly	5	2.0 – 2.8
Total Suspended Solids	weekly	5	2.0 – 2.8
Total Phosphorus	weekly	0.10	0.06 – 0.12
Total Ammonia Nitrogen (May 1 to November 30)	weekly	1.2	0.1
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	4.0	0.1
Total Chlorine Residual	weekly	non-detect	detected
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	1 – 82 organisms/100 mL

pH any single sample	weekly	6.5 – 9.0	6.55 – 7.68

Thamesford single sample effluent objective exceedance in 2017 included the following:

Month	Parameter	**Objective mg/L**	**Result mg/L**
Mar 1	TP	0.10	0.16
Mar 8	TP	0.10	0.16
Mar 15	TP	0.10	0.13
Dec 6	TP	0.10	0.12

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There was a reported exceedance of chlorine residual of 0.02 mg/L on March 31, 2017. It was reported to the MOECC at the time of occurrence. The incident responded to immediately upon discovery and resolved. The subsequent investigation determined that a communication cable used to regulate chlorine dosage was faulty.

4. Maintenance of Works

The operating and maintenance staff at the Thamesford WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted Flowmetrics Technical Services Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

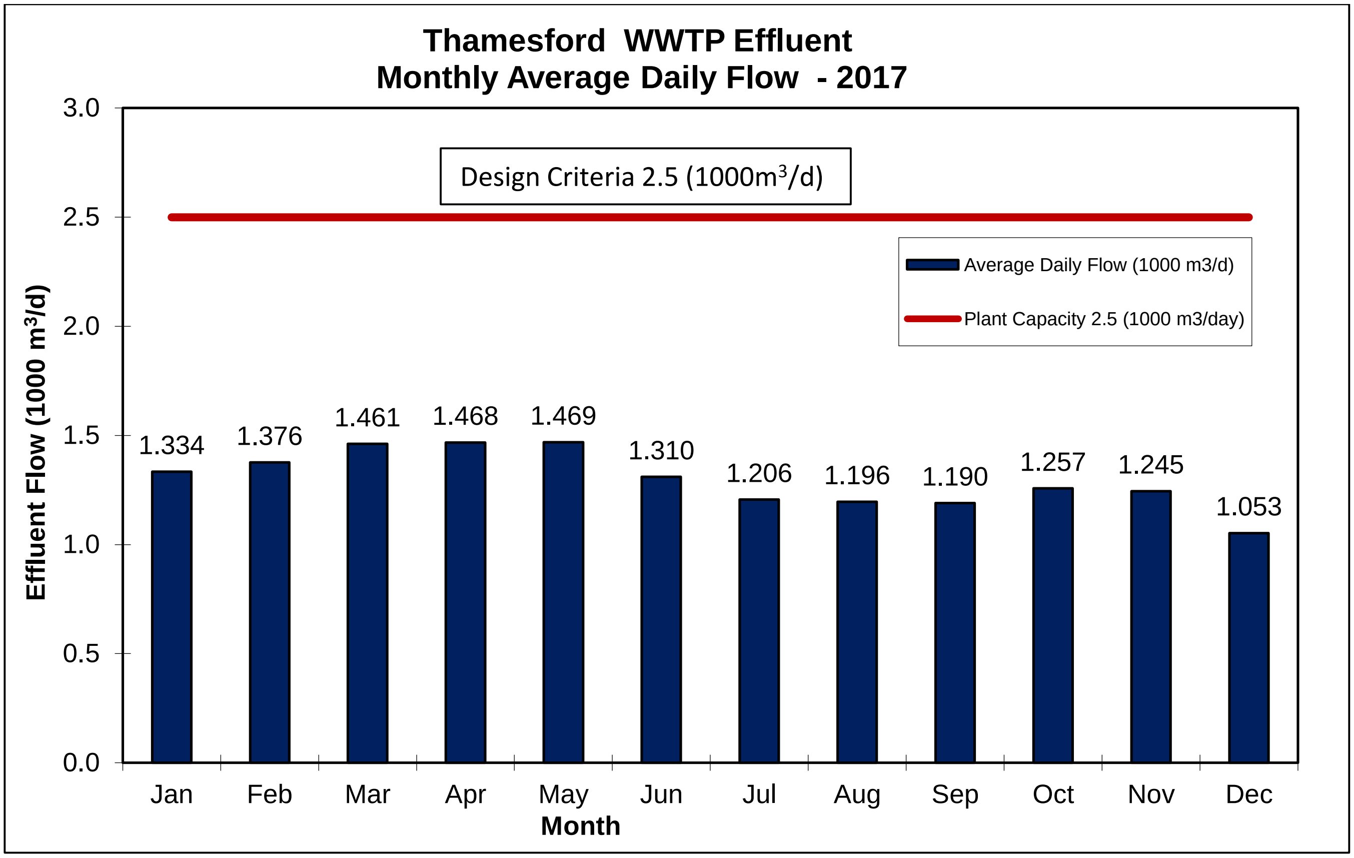
6. 2017 Biosolids Program

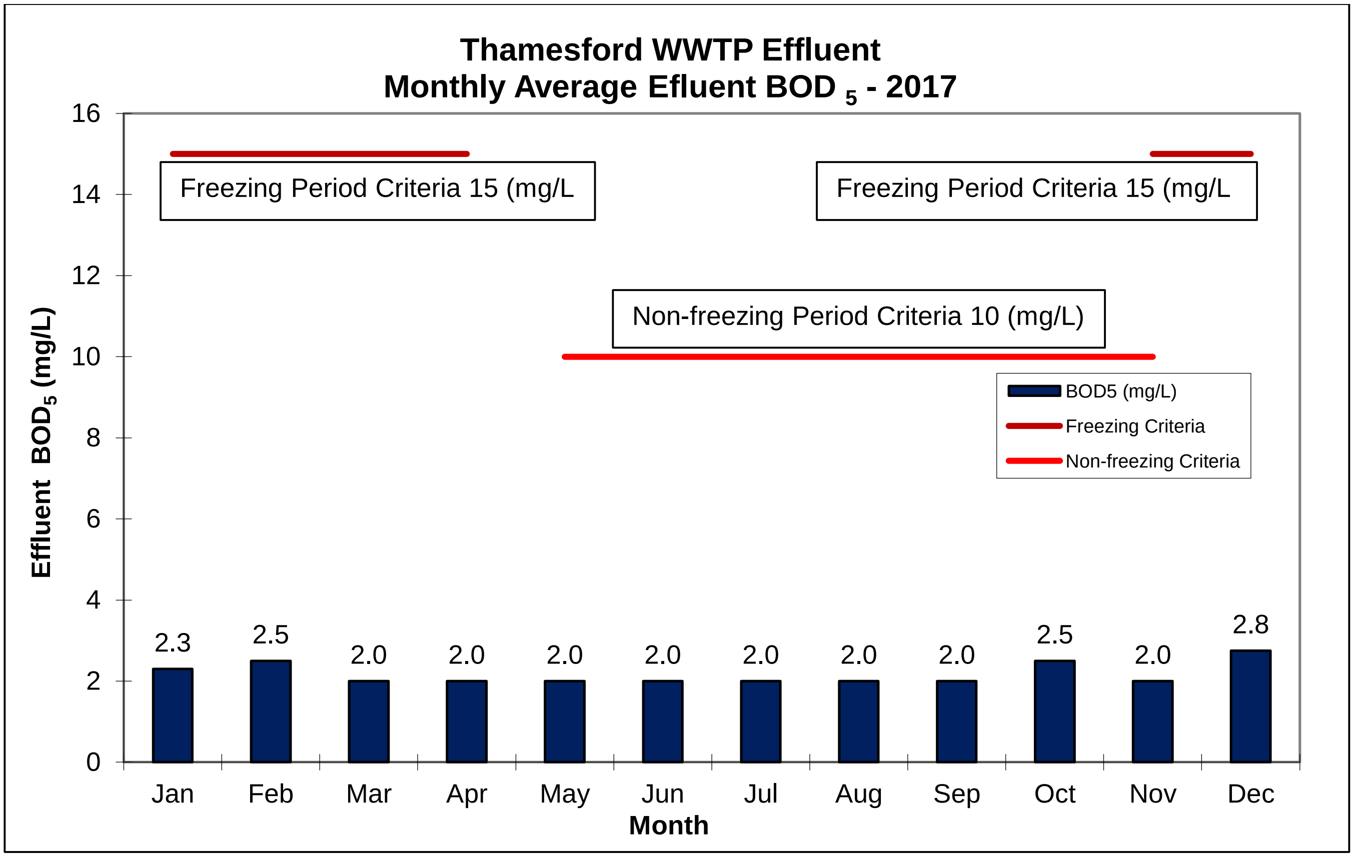
Biosolids are aerobically digested and stored as liquid at the Thamesford WWTP. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

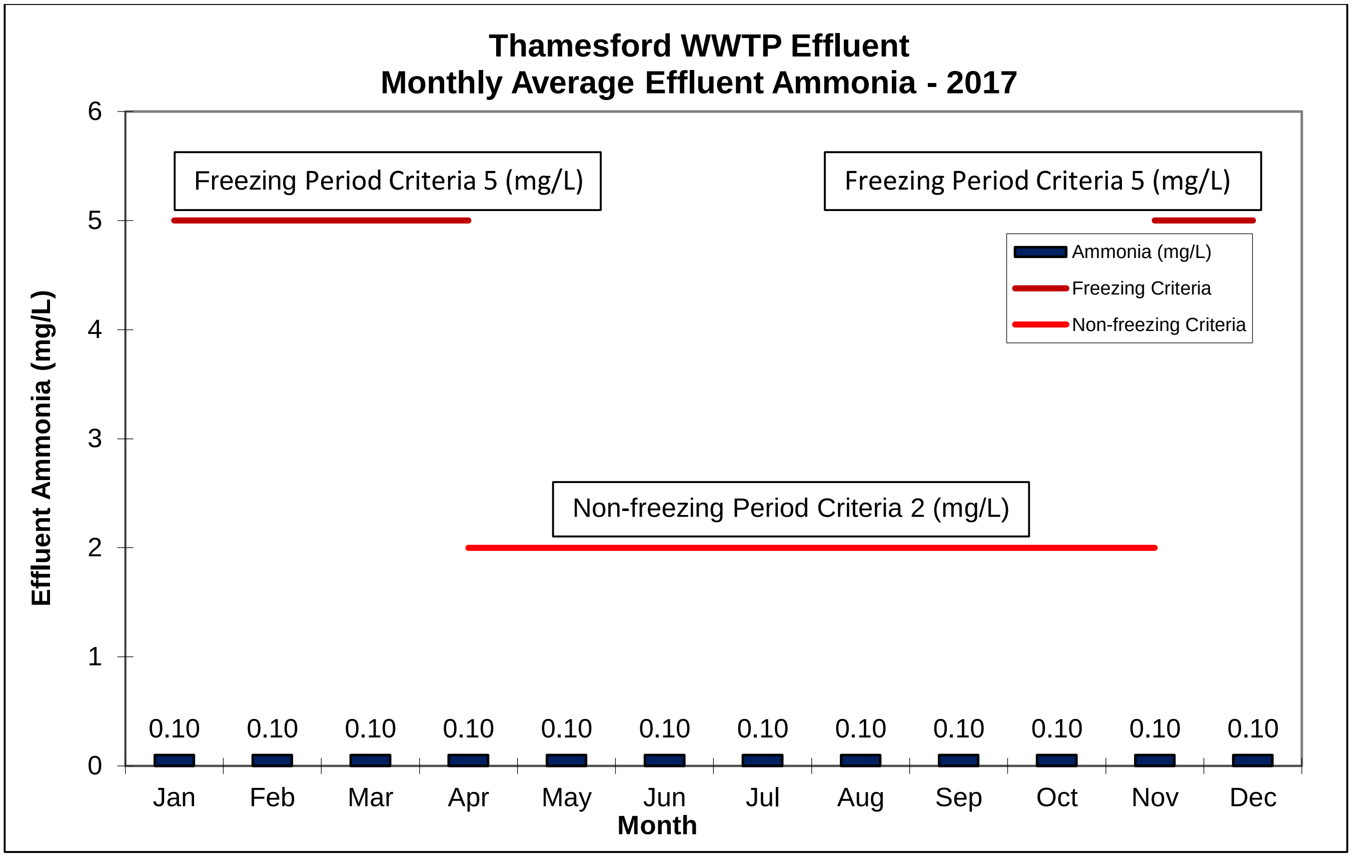
7. Audits, Pilots, and Trials

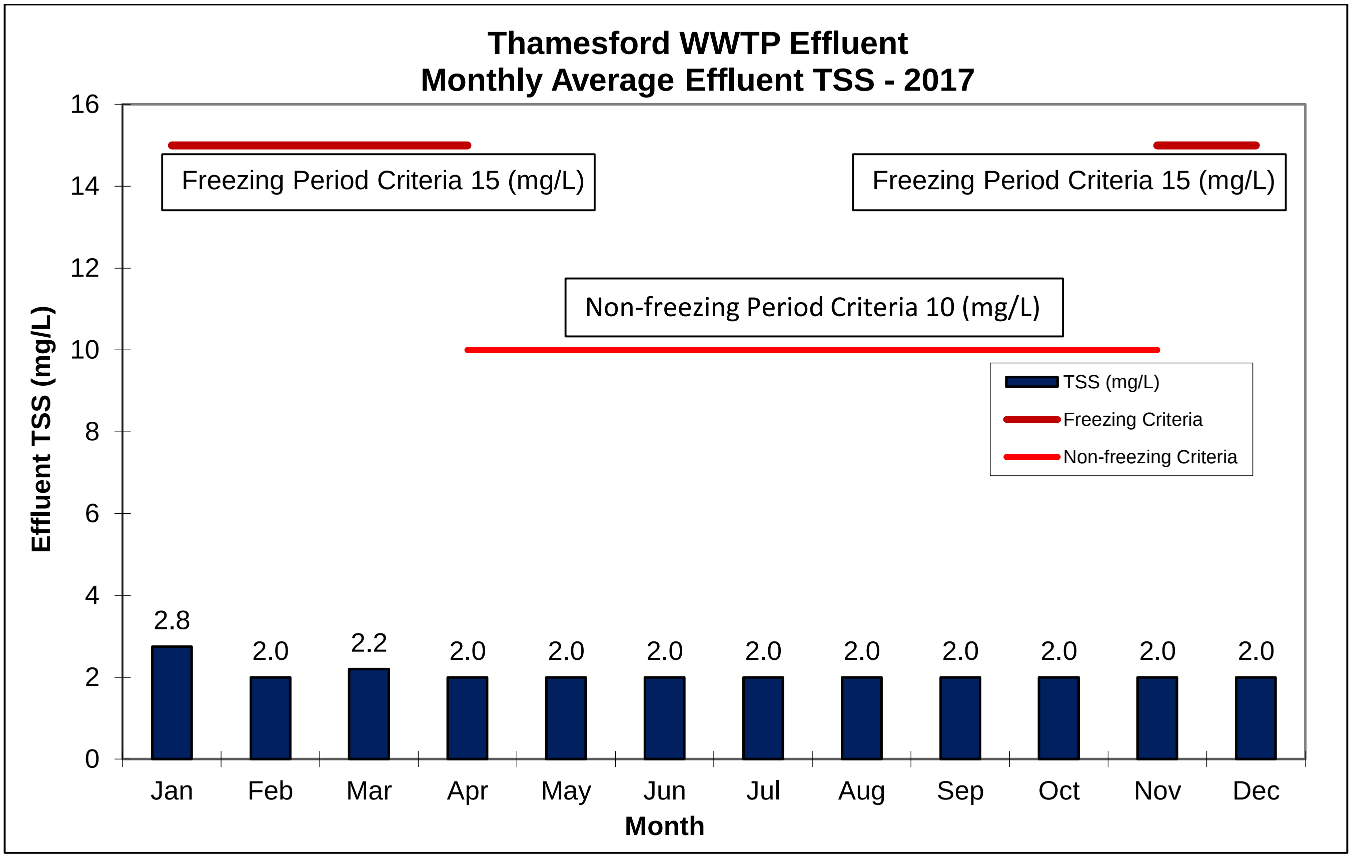
There was no MOECC audit in 2017.

APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS






Thamesford WWTP Effluent
Monthly Average Effluent Ammonia - 2017
Effluent Ammonia (mg/L)
6
5
4
3
2
1
0
Freezing Period Criteria 5 (mg/L)
Freezing Period Criteria 5 (mg/L)
Ammonia (mg/L)
Freezing Criteria
Non-freezing Criteria
Non-freezing Period Criteria 2 (mg/L)
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.10
0.10
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Thamesford WWTP Effluent
Monthly Average Effluent TSS - 2017
Effluent TSS (mg/L)
16
14
12
10
8
6
4
2
0
Freezing Period Criteria 15 (mg/L)
Freezing Period Criteria 15 (mg/L)
Non-freezing Period Criteria 10 (mg/L)
TSS (mg/L)
Freezing Criteria
Non-freezing Criteria
2.8
2.0
2.2
2.0
2.0
2.0
2.0
2.0
2.0
2.0
2.0
2.0
Jan
Feb
Mar
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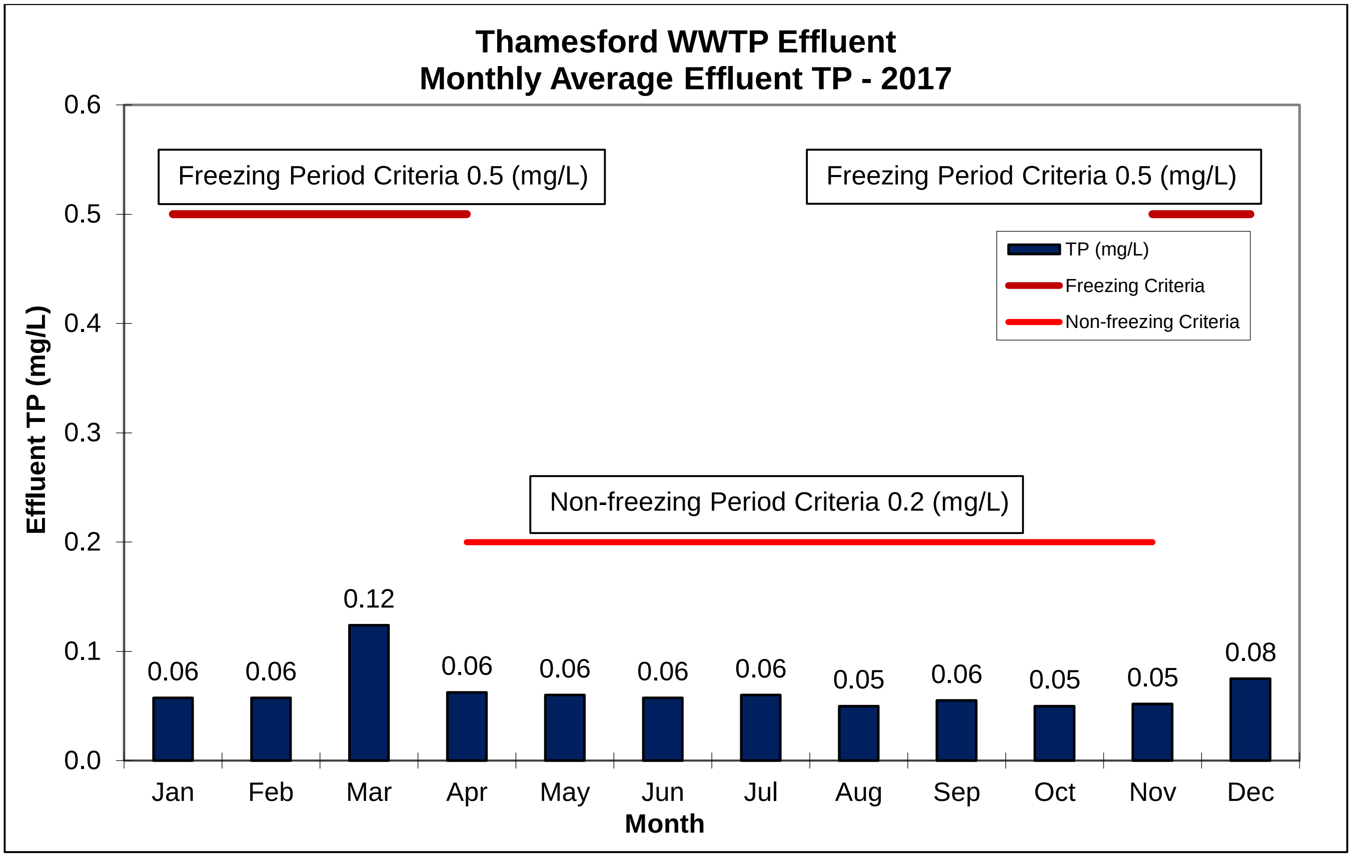
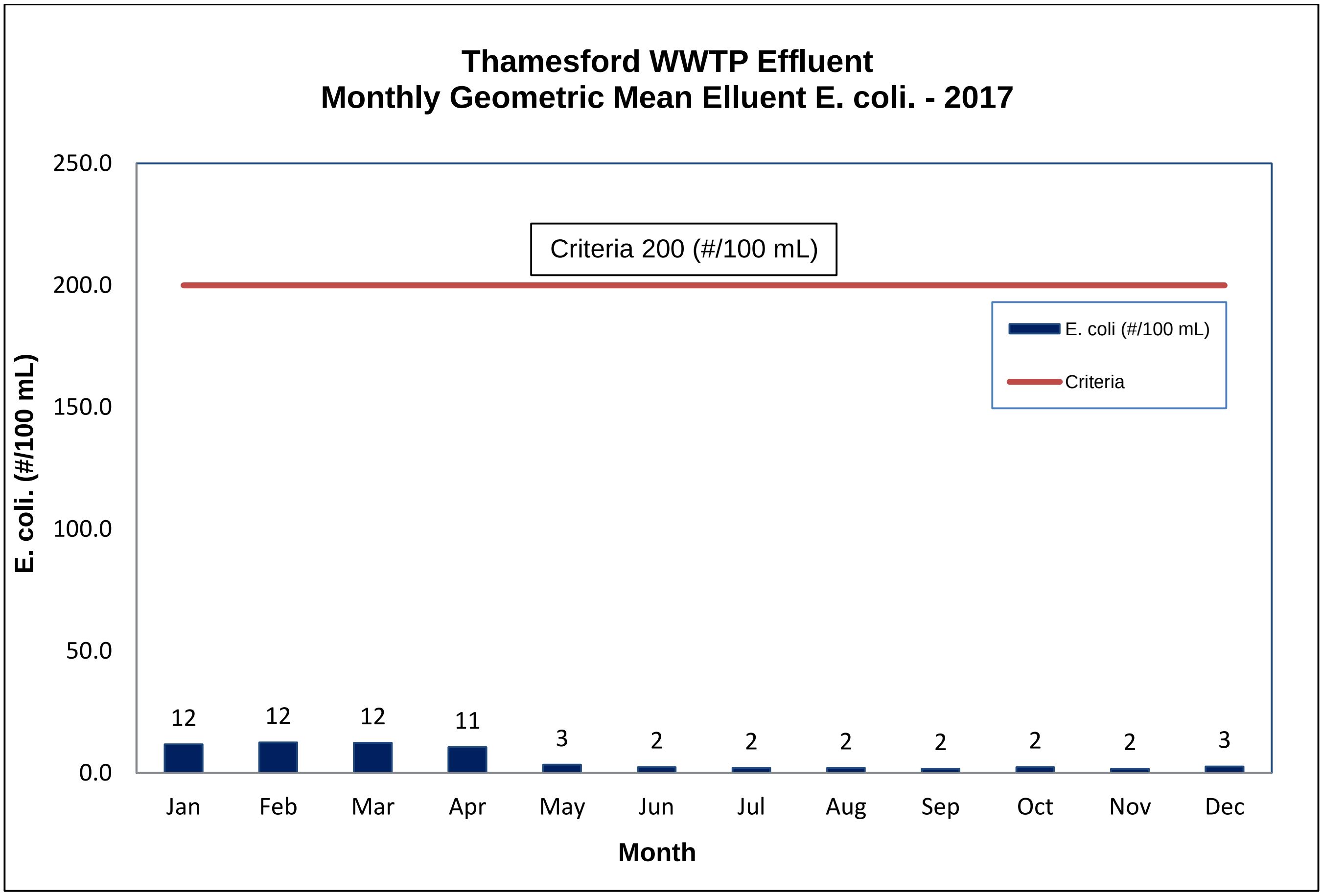
Aug
Sep
Oct
Nov
Dec
Month


Thamesford WWTP Effluent
Monthly Average Effluent TP - 2017
Effluent TP (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Freezing Period Criteria 0.5 (mg/L)
Freezing Period Criteria 0.5 (mg/L)
TP (mg/L)
Freezing Criteria
Non-freezing Criteria
Non-freezing Period Criteria 0.2 (mg/L)
0.06
0.06
0.12
0.06
0.06
0.06
0.06
0.05
0.06
0.05
0.05
0.08
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Thamesford WWTP Effluent
Monthly Geometric Mean Elluent E. coli. - 2017
E. coli. (#/100 mL)
250.0
200.0
150.0
100.0
50.0
0.0
Criteria 200 (#/100 mL)
E. coli (#/100 mL)
Criteria
12
12
12
11
3
2
2
2
2
2
2
3
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Tillsonburg Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Tillsonburg Wastewater Treatment Plant (WWTP)
Wastewater Treatment Plant Number:	110000757
Environmental Compliance Approval (ECA)	#9997-82RS5A Updated November 30 2017 #5564-AQNLC2
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Tillsonburg WWTP is a Class III facility that provides wastewater treatment for residential, commercial, and industrial users in the Town of Tillsonburg. The WWTP is a conventional activated sludge plant consisting of primary and secondary treatment, with an outfall pipe to the Big Otter Creek.
The ECA was amended in 2017 to allow for new pumps with larger capacity to be installed in the John Pound Lift Station, to accommodate storm events. The work will be completed in 2018.

A standby generator is available to run the main influent pump station (John Pound Road lift station) in the event of a power failure.

The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The wastewater treatment plant is located in Coronation Park, Tillsonburg, Ontario. The Facility description is provided below.

Facility	Tillsonburg Wastewater Treatment Plant
Design Capacity	8,180 m^3/d
2017 Average Daily Flow	5,551 m^3/d
2017 Maximum Daily Flow	10,574 m^3/d

2017 Total Volume of Wastewater	2,025,811 m^3/year

Summary and Interpretation of Monitoring Data

1.2. Effluent Quality Assurance and Control Measures

Sampling Procedure

Raw sewage samples are collected where the influent streams combine before entering the sewage works. A composite sampler collects samples over a 24-hour duration on a bi-weekly basis.

The final effluent 24-hour composite sample is collected on a weekly basis after secondary treatment and disinfection, and prior to the effluent discharge to Big Otter Creek.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All other in-house testing is done for process control, results of which are not included in this report.

1.3. Plant Performance & Effluent Quality

The Tillsonburg WWTP provided effective treatment in 2017 meeting all but one of its regulatory limits for all parameters in the effluent discharged to Big Otter Creek. During the month of August the average monthly concentration of TSS in the plant effluent was 27 mg/L, with a compliance limit of 25 mg/L. The corresponding Average waste loading limit of 203 kg/d was not exceeded as the Average flow for August was 5,102 m³/d giving a resultant loading of 138 kg/d.

Tillsonburg WWTP – Non-compliance 2017

Month	Parameter	Limit	Result (mg/L)
August 2017	Monthly Average TSS mg/L	25 mg/L	27 mg/L

On a bi-weekly basis, the operator measures pH of the influent stream and on a weekly basis, measures pH of the effluent stream. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2017.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A. Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
$CBOD_5$	242	1343
Total Suspended Solids	186	1032
Total Phosphorus	3.9	22
Total Kjeldahl Nitrogen	29	161

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min.-Max.** (milligram per liter unless otherwise indicated)	**Percentage Removal**
$CBOD_5$	weekly	25	2.0 – 10.6	95.6 – 99.2
Total Suspended Solids	weekly	25	6.3 – 27.2	85.4 – 96.6

Total Phosphorus	weekly	1	0.2 – 0.7	82.1 – 94.9
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2.8 – 142.0 organisms/100 mL	--
pH any single sample	weekly	6.0 - 9.5	6.5 – 7.8	--

1.4. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All monthly effluent discharge objectives listed in the Plant's ECA were met at the Tillsonburg WWTP in 2017 with the exception of the monthly average concentration objective for TSS (15 mg/L) for the months of August (27.2 mg/L) and September (19 mg/L). The following table presents the range of effluent discharge values vs. ECA Objectives. Several single sample objective exceedances occurred throughout the fall of 2017, and are in the table below.

Effluent Parameter	Sample Frequency	Monthly Average Objective Concentration (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	15	2.0 – 10.6
Total Suspended Solids	weekly	15	6.3 – 27.2
Total Phosphorus	weekly	0.8	0.2 – 0.7
E. coli (May 1 – October 31)	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	2.8 – 142.0
pH any single sample	weekly	6.5 - 8.0	6.5 – 7.8

Tillsonburg single sample effluent objective exceedances in 2017 included the following:

Date	Parameter	Objective mg/L	Result mg/L
Aug 9	TSS	15.0	21.0
Aug 23	TSS	15.0	88.0
Sept 6	TSS	15.0	57.0
Oct 4	TSS	15.0	17.0
Nov 22	TSS	15.0	20.0
Aug 23	TP	0.8	1.35
Sept 6	TP	0.8	1.06
Aug 23	CBOD	15	33.0

2. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were several months of upset conditions at the WWTP in 2017 brought about by several hours of very low and very high influent pH. The non-compliant pH was entering the WWTP via the gravity sewer line overnight on a regular basis, due to an industrial discharge. As a result, the WWTP's upset condition lead to an exceedance of TSS limit of 25 mg/L in the plants ECA which was reported to the MOECC at the time of occurrence. Oxford County's sewer use bylaw team, Public Works management, operations staff, and the staff at the local industry involved made a concerted effort to address the issue. The efforts to achieve compliance with the pH requirements of between pH 5.5 to pH 10.5 are ongoing and progress has been made.

3. Maintenance of Works

The operating and maintenance staff at the Tillsonburg WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

4. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by Flowmetrics Inc. The records are kept on-site at the Plant. Operational monitoring equipment calibration records are kept on-site at the Plant.

5. 2017 Biosolids Program

Biosolids are aerobically digested and dewatered at the Tillsonburg WWTP using an Alfa-Laval Centrifuge. The Biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

6. Audits, Pilots, and Trials

There was no MOECC audit in 2017.

The plant is involved in a University of Waterloo study of small wastewater treatment plants. The project involves characterizing the sustainability of sludge handling in small WWTPs in Ontario. The goals for the project are to:

- characterize the current performance of small WWTPs with respect to a number of sustainability performance indicators
- assess whether the introduction of innovative technologies might enhance the sustainability of operations.

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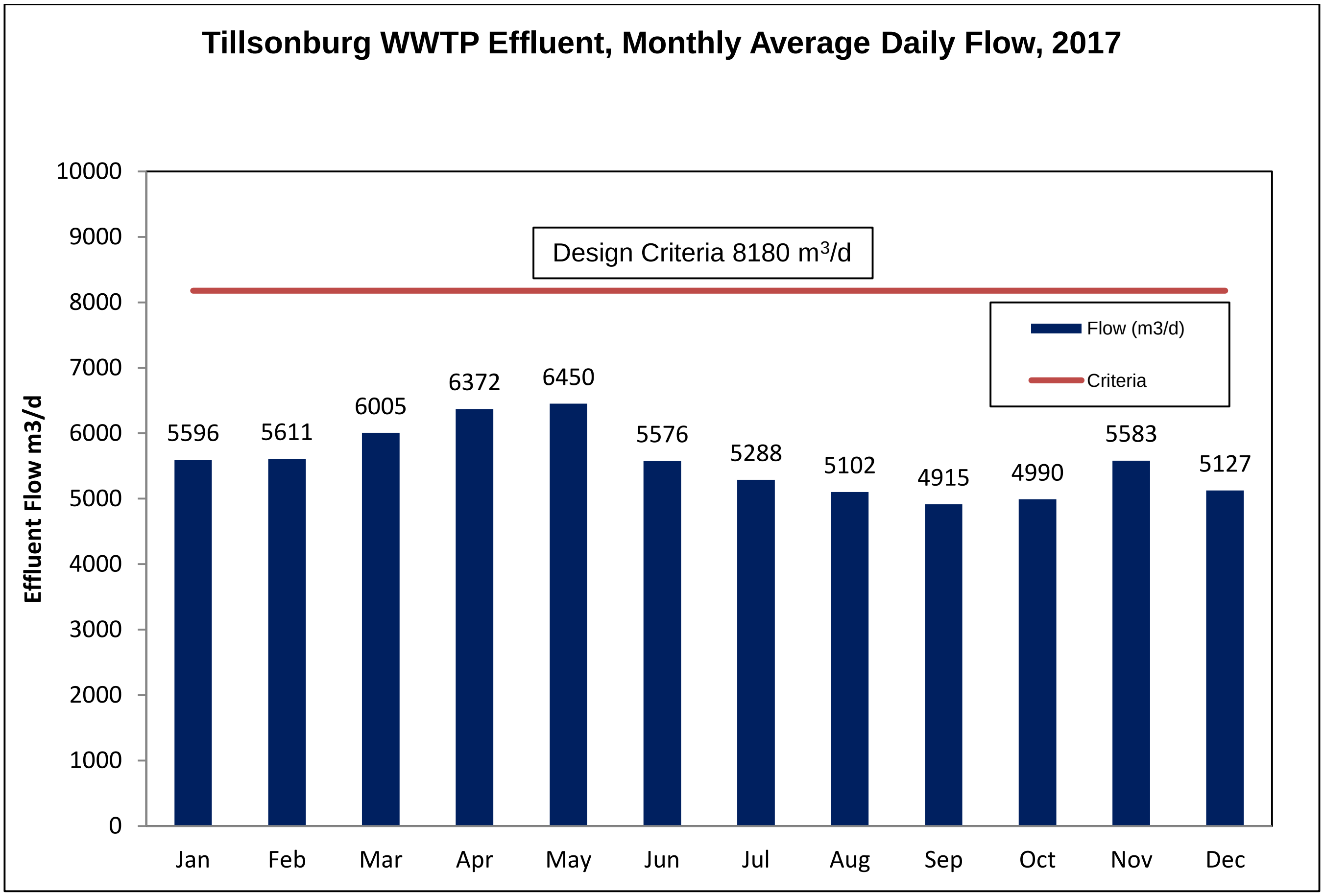
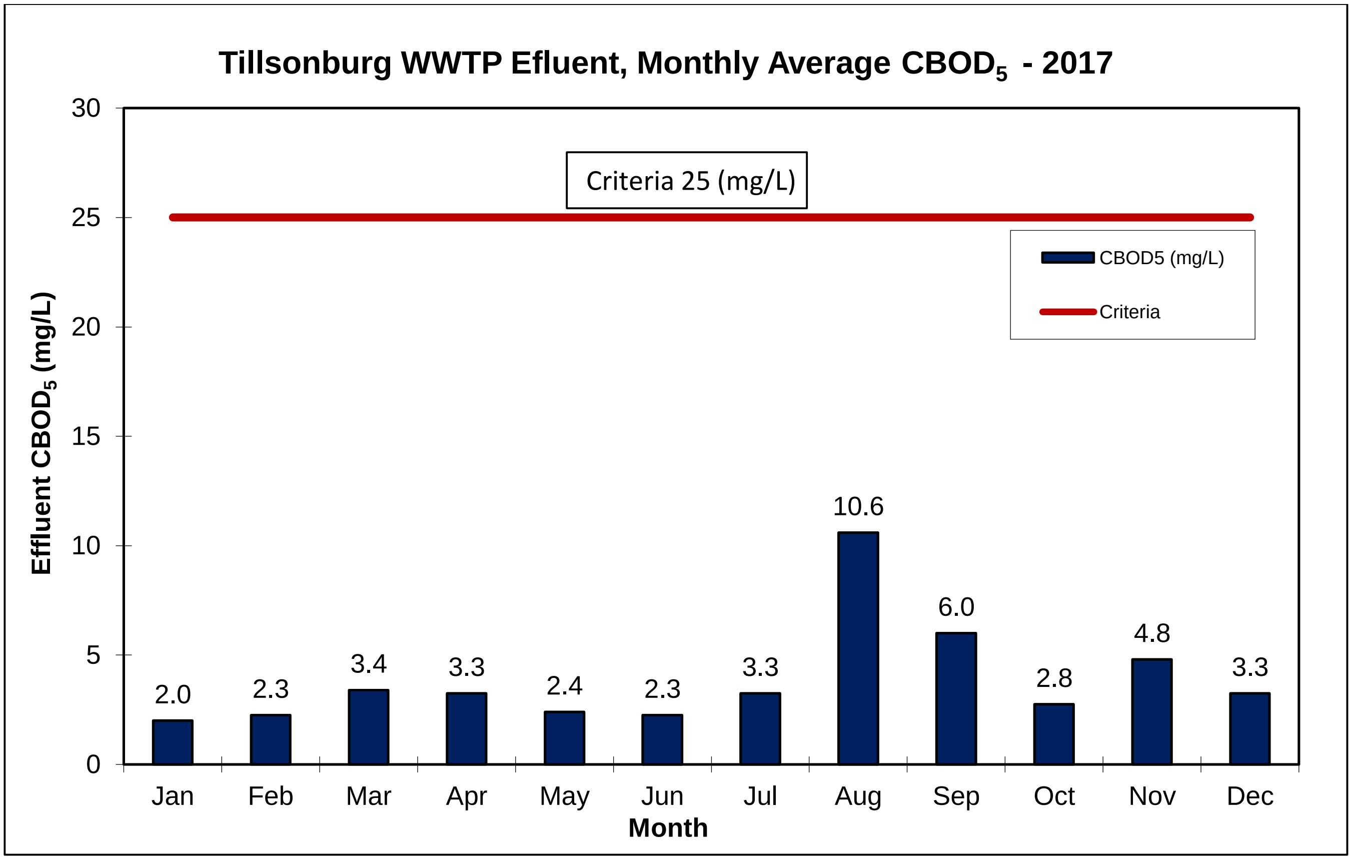
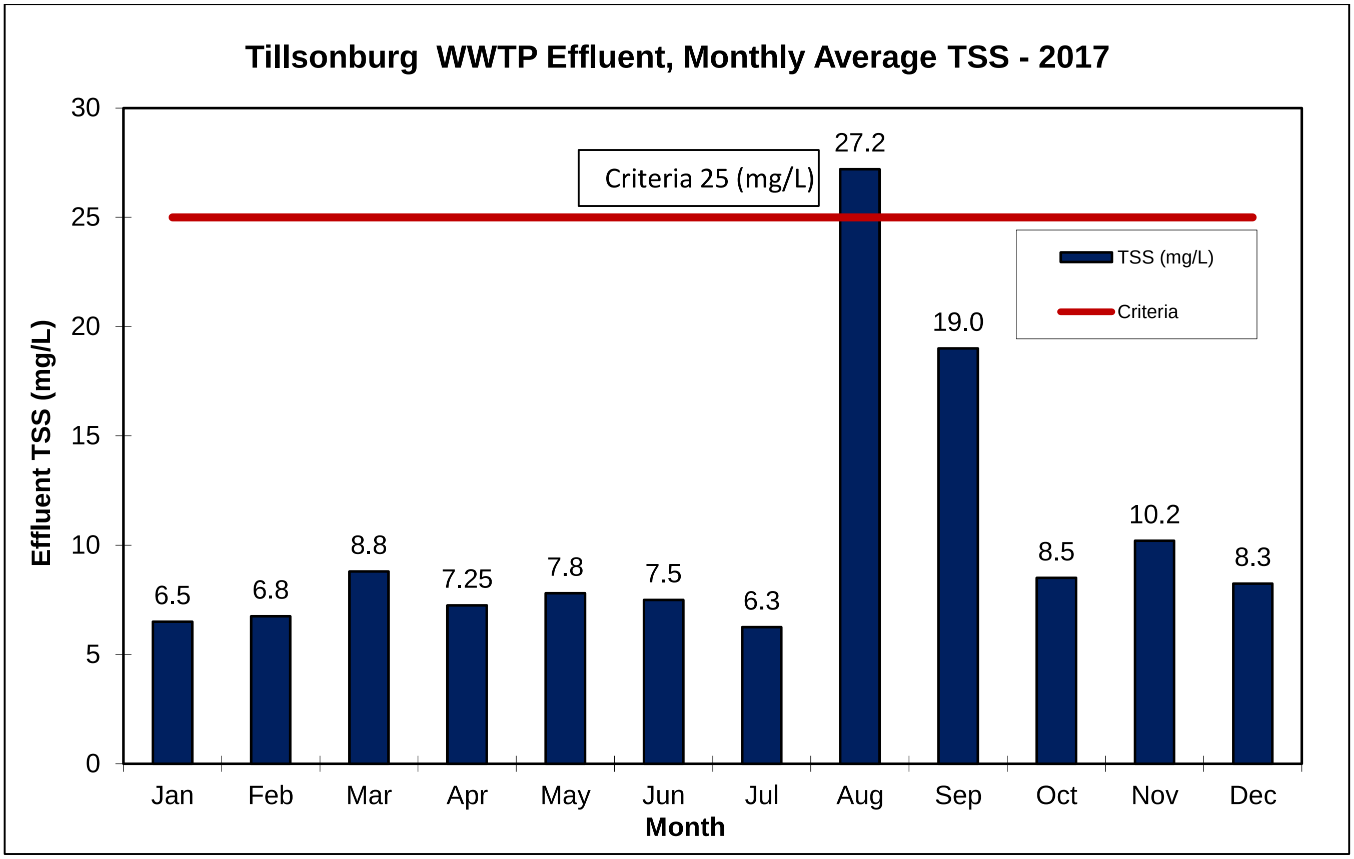
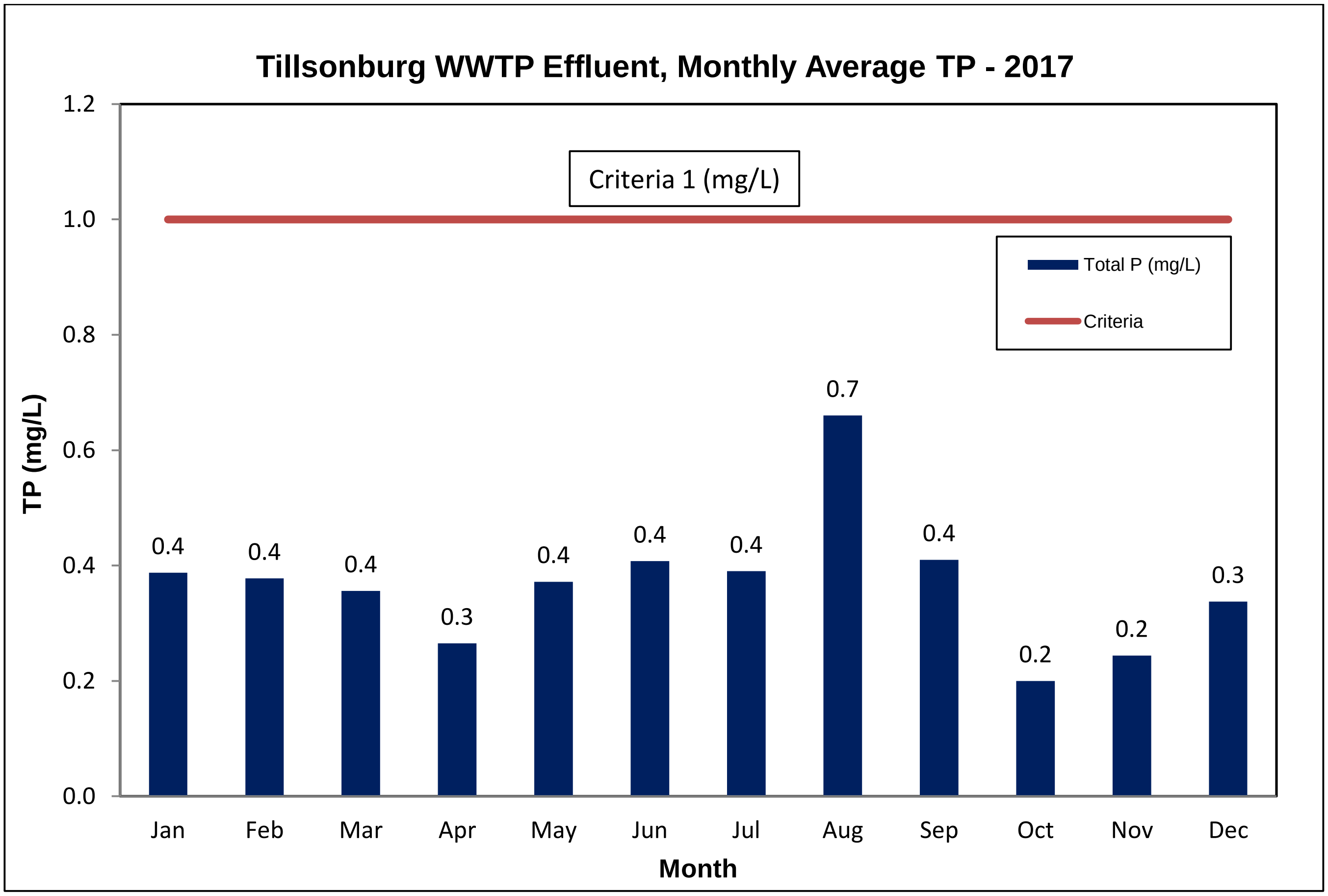
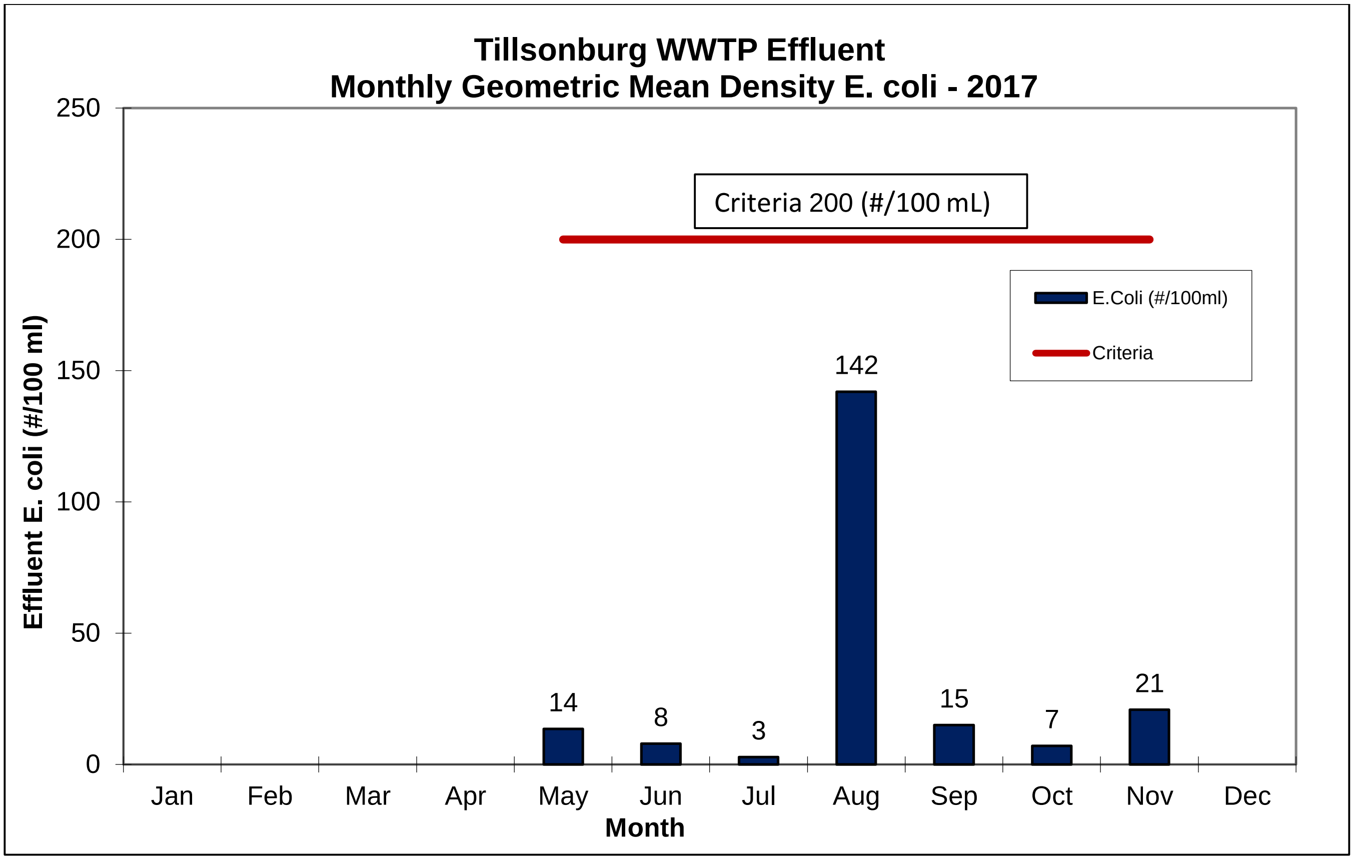
APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VERSUS EFFLUENT DISCHARGE LIMITS






Tillsonburg WWTP Effluent, Monthly Average TSS - 2017
Effluent TSS (mg/L)
Month
Criteria 25 (mg/L)
TSS (mg/L)
Criteria
30
25
20
15
10
5
0
Jan 6.5
Feb 6.8
Mar 8.8
Apr 7.25
May 7.8
Jun 7.5
Jul 6.3
Aug 27.2
Sep 19.0
Oct 8.5
Nov 10.2
Dec 8.3


Tillsonburg WWTP Effluent, Monthly Average TP - 2017
TP (mg/L)
Month
Criteria 1 (mg/L)
Total P (mg/L)
Criteria
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan 0.4
Feb 0.4
Mar 0.4
Apr 0.3
May 0.4
Jun 0.4
Jul 0.4
Aug 0.7
Sep 0.4
Oct 0.2
Nov 0.2
Dec 0.3


Tillsonburg WWTP Effluent
Monthly Geometric Mean Density E. coli - 2017
Criteria 200 (#/100 mL)
E.Coli (#/100ml)
Criteria
Effluent E. coli (#/100 ml)
250
200
150
100
50
0
14
8
3
142
15
7
21
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2017 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Woodstock Wastewater Treatment Plant

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1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Woodstock Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120000685
Environmental Compliance Approval (ECA) #:	#5950-7XQKXS
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2017 – December 31, 2017

1.1. System Description

The Woodstock WWTP is a Class IV rated treatment facility provides wastewater treatment for residential, commercial, and industrial users in the City of Woodstock and for the communities of Embro and Innerkip. It also provides treatment for septic tank waste, hauled waste, and holding tank waste from within Oxford County.

The wastewater treatment plant is located at 195 Admiral Street Woodstock, Ontario and is a conventional activated sludge system consisting of primary and secondary treatment, with an outfall pipe to the Thames River.

A standby generator is available to run the onsite Thames Valley Lift Station in the event of a power failure. The treatment plant is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The facility provided effective wastewater treatment in 2017, as demonstrated by the table below.

Facility	Woodstock Wastewater Treatment Plant
Design Capacity (Average Day)	33,000 m^3/d
Design Capacity (Peak Flow)	66,000 m^3/d
2017 Average Daily Flow	23,018 m^3/d
2017 Maximum Daily Flow	89,337 m^3/d

2017 Total Volume of Wastewater	8,399,734 m^3/year
2017 Total Received Hauled Waste	23,602 m^3/year

Summary and Interpretation of Monitoring Data

1.2. Effluent Quality Assurance and Control Measures

Sampling Procedure

Wastewater samples are collected on a weekly basis. Raw sewage samples are collected where the sewer trunks combine before entering the sewage works. An automatic composite sampler collects samples over a 24-hour period. Following primary treatment, a second 24-hour composite sample is collected. A third and final effluent 24-hour composite sample is collected following secondary treatment, disinfection and de-chlorination prior to the effluent discharge to the Thames River.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance, except for pH, DO, chlorine residual and temperature, which are field collected. All other in-house testing is done for process control and is not included in this report.

1.3. Plant Performance & Effluent Quality

The Woodstock WWTP provided effective treatment in 2017 meeting all its regulatory limits for all parameters in the effluent discharged to the Thames River.

On a weekly basis (minimum), the operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2017.

Staff tests Total Residual Chlorine (TRC) in the treated effluent on a daily basis; well in excess of the required weekly testing frequency. In 2017, the monthly average results at all times met the Monthly Average TRC limit and were less than 0.05 mg/L and, therefore, were in compliance. The Federal Government's P2 target for TRC of 0.02 mg/L was substantially met on the annual average TRC of 0.247 mg/L in 2017.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD$_5$	132	3038
Total Suspended Solids	196	4512
Total Phosphorus	2.8	64
Total Kjeldahl Nitrogen	17.8	410

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min.-Max.** (milligram per liter unless otherwise indicated)	**Percentage Removal**
CBOD$_5$ (May 01 to November 30)	weekly	15	2.0 – 2.8	97.7 – 98.4
CBOD$_5$ (December 01 to April 30)	weekly	20	2.2 – 3.8	96.9 – 98.2
Total Suspended Solids	weekly	15	2.0 – 6.0	96.9 – 99.0
Total Phosphorus	weekly	0.75	0.13 – 0.29	89.6 – 95.4

Total Ammonia Nitrogen (May 1 to November 30)	weekly	3	0.10 – 0.43	96.7 – 99.2
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	5.0	0.15 – 0.23	98.3 – 98.9
Total Chlorine Residual (May 1-October 31)	weekly	<0.05	0.02 – 0.03	N/A
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	4.0 – 58.4 organisms/100 mL	N/A
pH any single sample	weekly	6.0 - 9.5	6.7 – 7.8	N/A

1.4. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Woodstock WWTP in 2017.
The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	12	2.0 – 3.8
Total Suspended Solids	weekly	12	2.0 – 6.0
Total Phosphorus	weekly	0.5	0.13 - 0.29
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.10 - 0.43
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	3.0	0.15 - 0.23
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	4.0 – 58.4 organisms/100 mL
pH any single sample	weekly	6.0 - 8.5	6.7 – 7.8

2. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypassing, upsets, spills, or abnormal conditions at the Woodstock WWTP in 2017.

On May 5, 2017 an overflow of approximately 100 m^3 of wastewater was discovered from a manhole located near the WWTP. The overflow was due to a large storm event and infiltration of storm water into the wastewater collection system. The duration of the event was monitored and City of Woodstock staff were informed as they are responsible for the operation of the wastewater collection system.

This event was reported to the MOECC at the time it occurred and no further action was required.

3. Maintenance of Works

The operating and maintenance staff at the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

4. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted Flowmetrics Technical Services Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

5. 2017 Biosolids Program

Biosolids are anaerobically digested and dewatered at the Woodstock WWTP using two Alfa-Laval Centrifuges. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

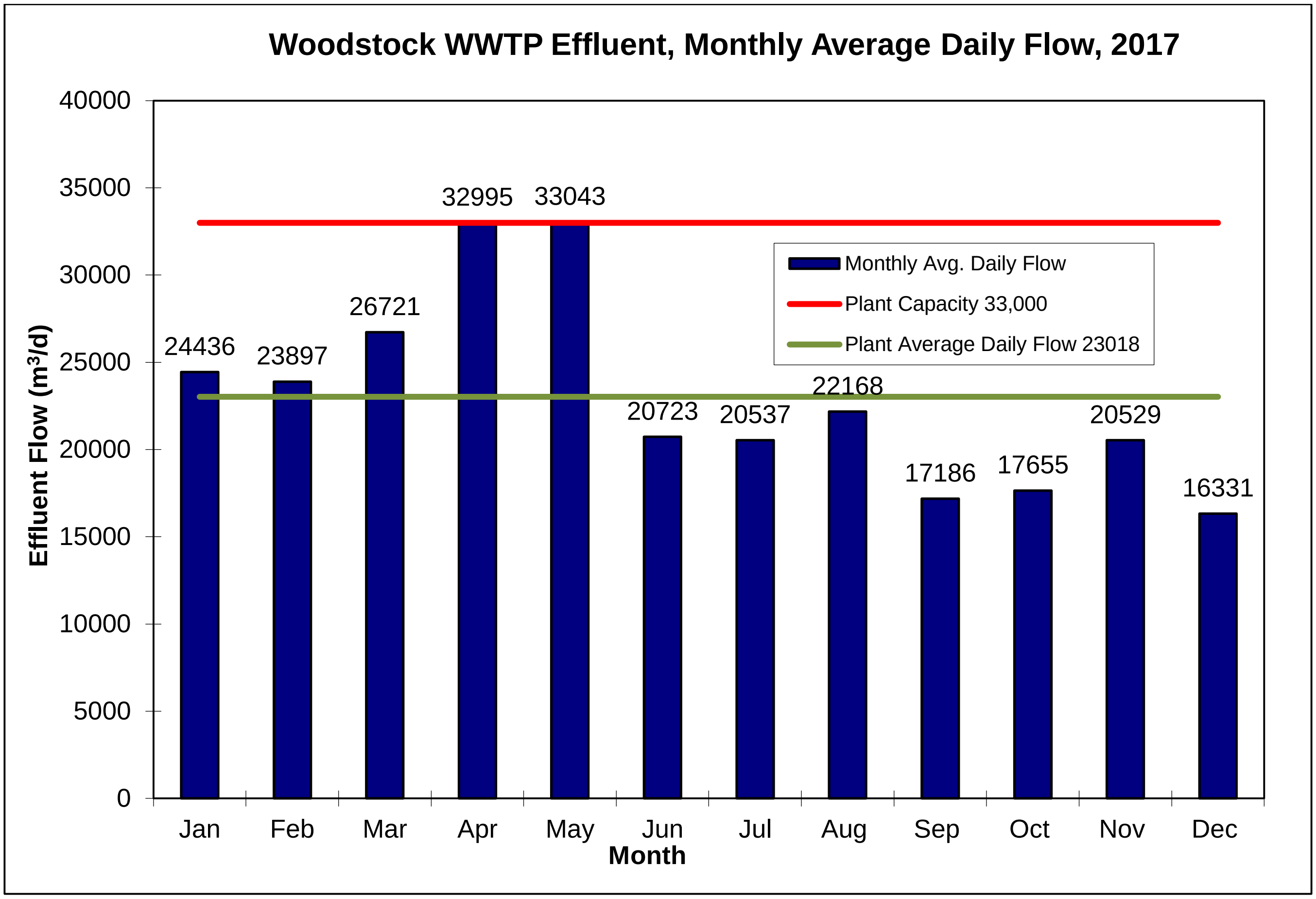
6. Inspection, Pilots, and Trials

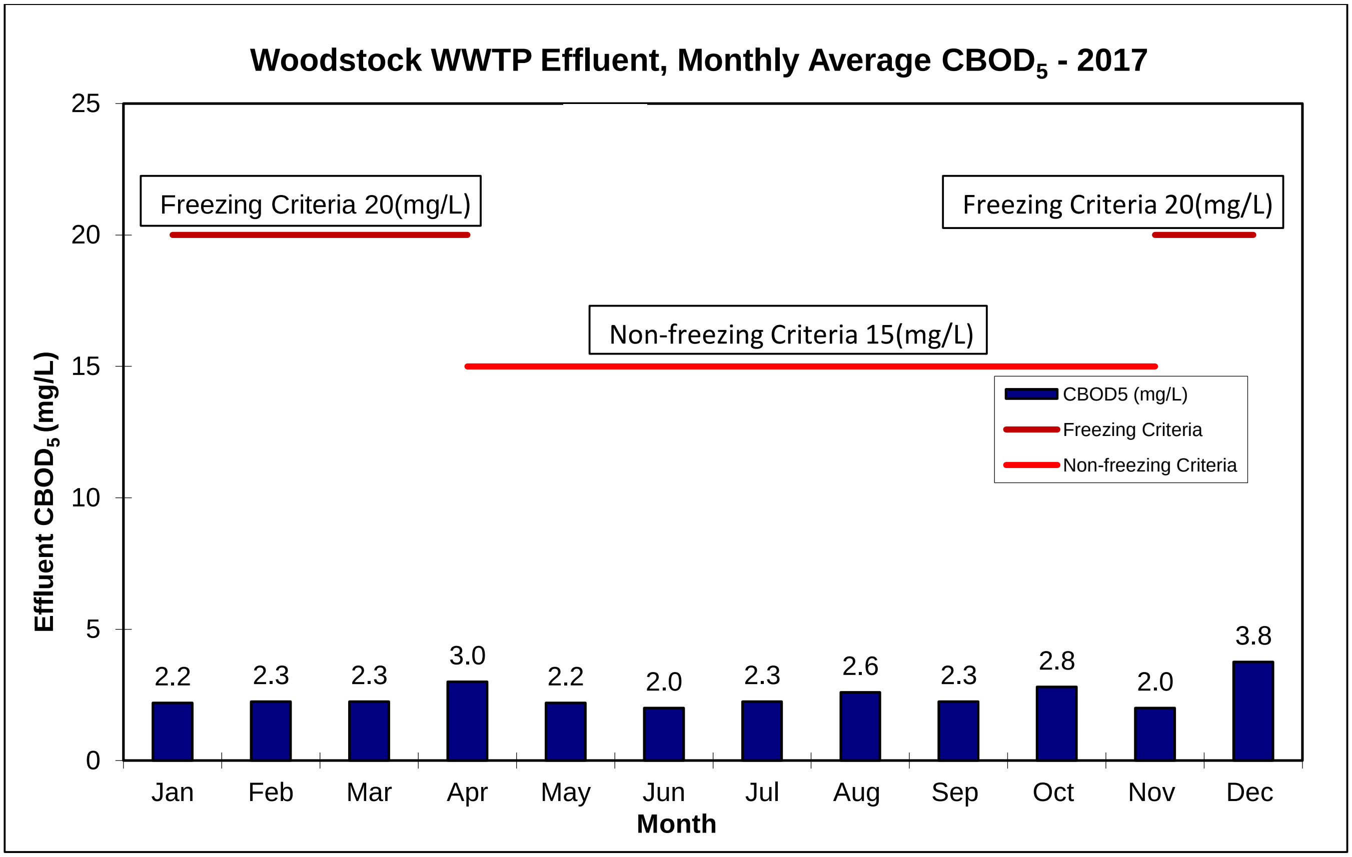
The Ministry of Environment and Climate Change (MOECC) did not conduct a facility inspection in 2017. The MOECC inspections typically occur on a 3-year schedule.

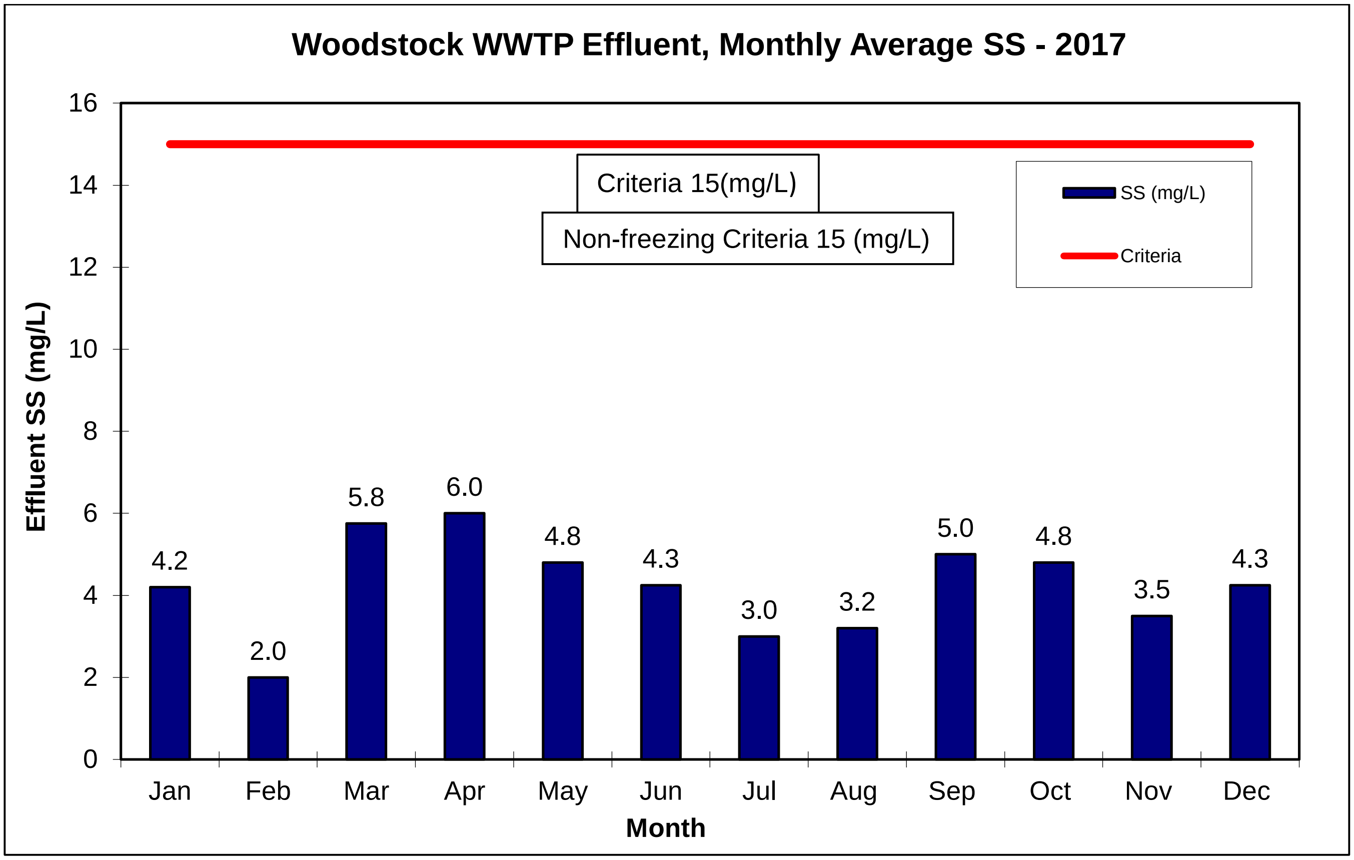
The County is participating with the MOECC in a pilot program called “Draw the Graph” which utilizes previously learned plant optimization training and applies it to a specific process within the plant. The project selected at Woodstock WWTP was to complete a solids balance across the anaerobic digesters by measuring side streams and solids levels in an effort to gage the volatile solids destruction across the units and their current capacity. This work is still ongoing.

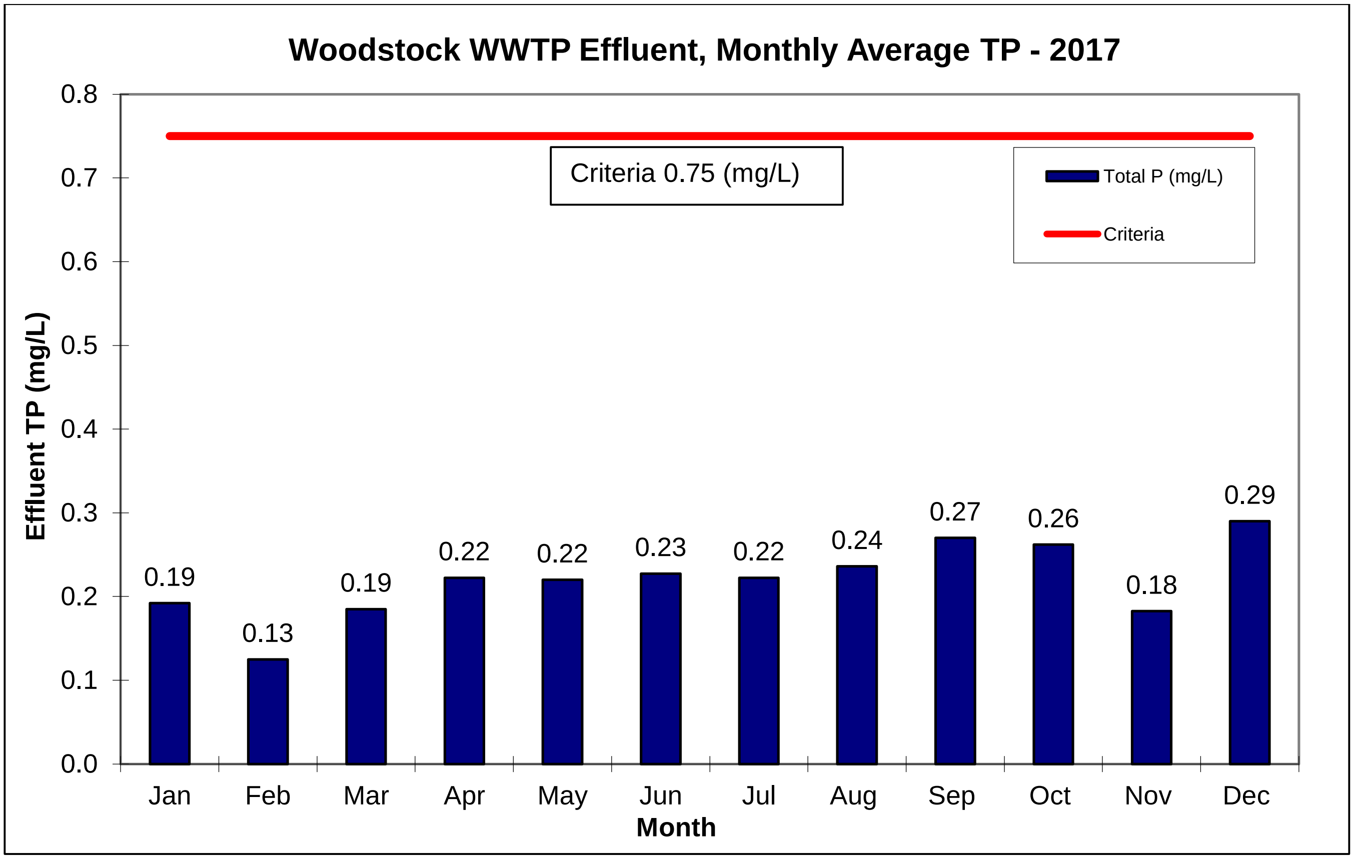
Energy Efficiency work is on-going at the Woodstock WWTP with the permission of MOECC approvals branch. Staff assisted by a third party consultant and the County’s Energy Management Coordinator have been piloting shutting down the second treatment train at the facility and optimizing treatment within the first train to achieve a reduction in energy use. The plant has performed well since the shutdown of the second treatment train over May to July A report summarizing the outcomes is being prepared and should be completed by March 2018. The unused capacity is available at any time should it be needed.

APPENDIX A: GRAPHS OF 2017 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS


Woodstock WWTP Effluent, Monthly Average Daily Flow, 2017


Woodstock WWTP Effluent, Monthly Average CBOD$_5$ - 2017


Woodstock WWTP Effluent, Monthly Average SS - 2017
Effluent SS (mg/L)
0
2
4
6
8
10
12
14
16
Criteria 15(mg/L)
Non-freezing Criteria 15 (mg/L)
SS (mg/L)
Criteria
4.2
2.0
5.8
6.0
4.8
4.3
3.0
3.2
5.0
4.8
3.5
4.3
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Woodstock WWTP Effluent, Monthly Average TP - 2017
Effluent TP (mg/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Criteria 0.75 (mg/L)
Total P (mg/L)
Criteria
0.19
0.13
0.19
0.22
0.22
0.23
0.22
0.24
0.27
0.26
0.18
0.29
Jan
Feb
Mar
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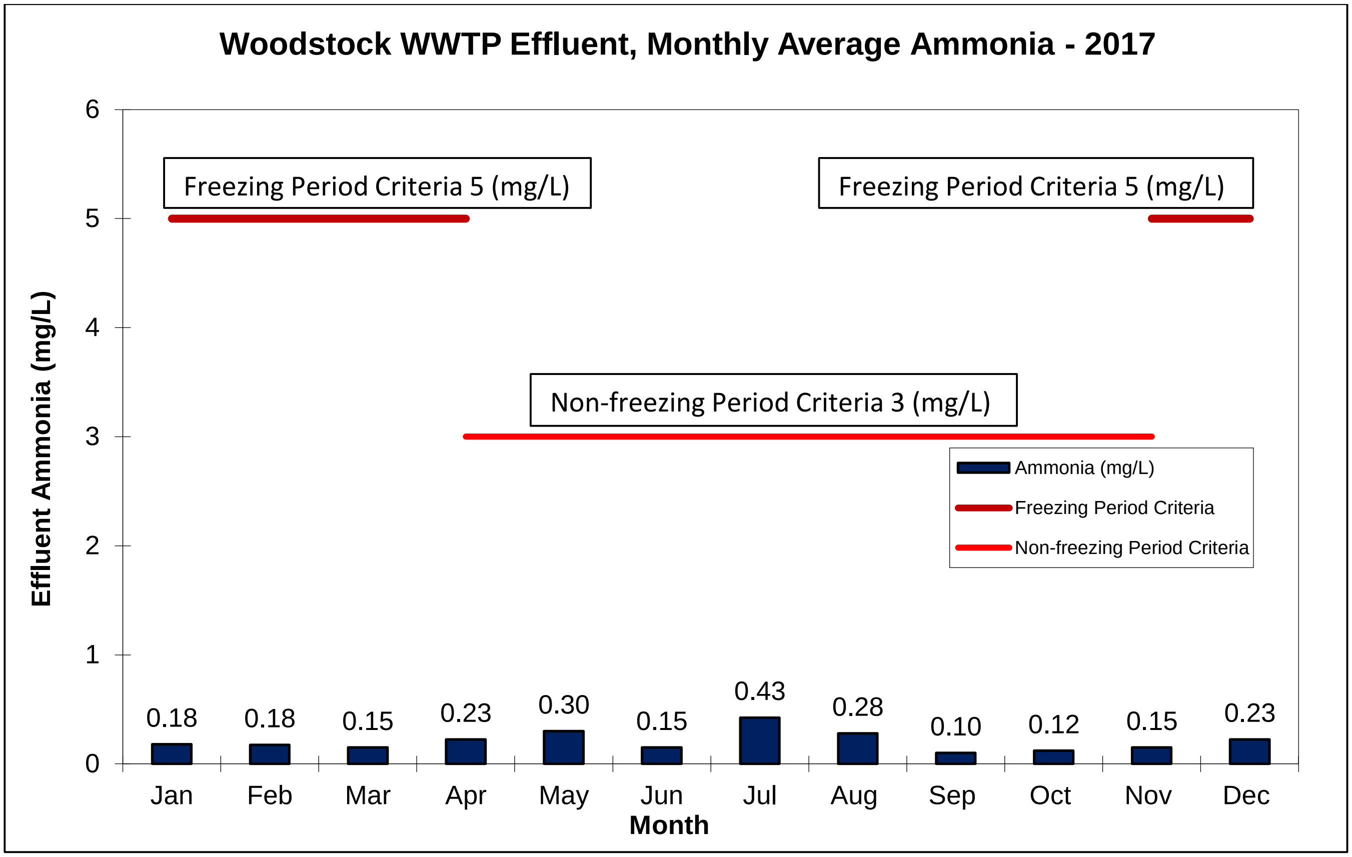
Sep
Oct
Nov
Dec
Month


Woodstock WWTP Effluent, Monthly Average Ammonia - 2017
Effluent Ammonia (mg/L)
0
1
2
3
4
5
6
Freezing Period Criteria 5 (mg/L)
Freezing Period Criteria 5 (mg/L)
Non-freezing Period Criteria 3 (mg/L)
Ammonia (mg/L)
Freezing Period Criteria
Non-freezing Period Criteria
0.18
0.18
0.15
0.23
0.30
0.15
0.43
0.28
0.10
0.12
0.15
0.23
Jan
Feb
Mar
Apr
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Jun
Jul
Aug
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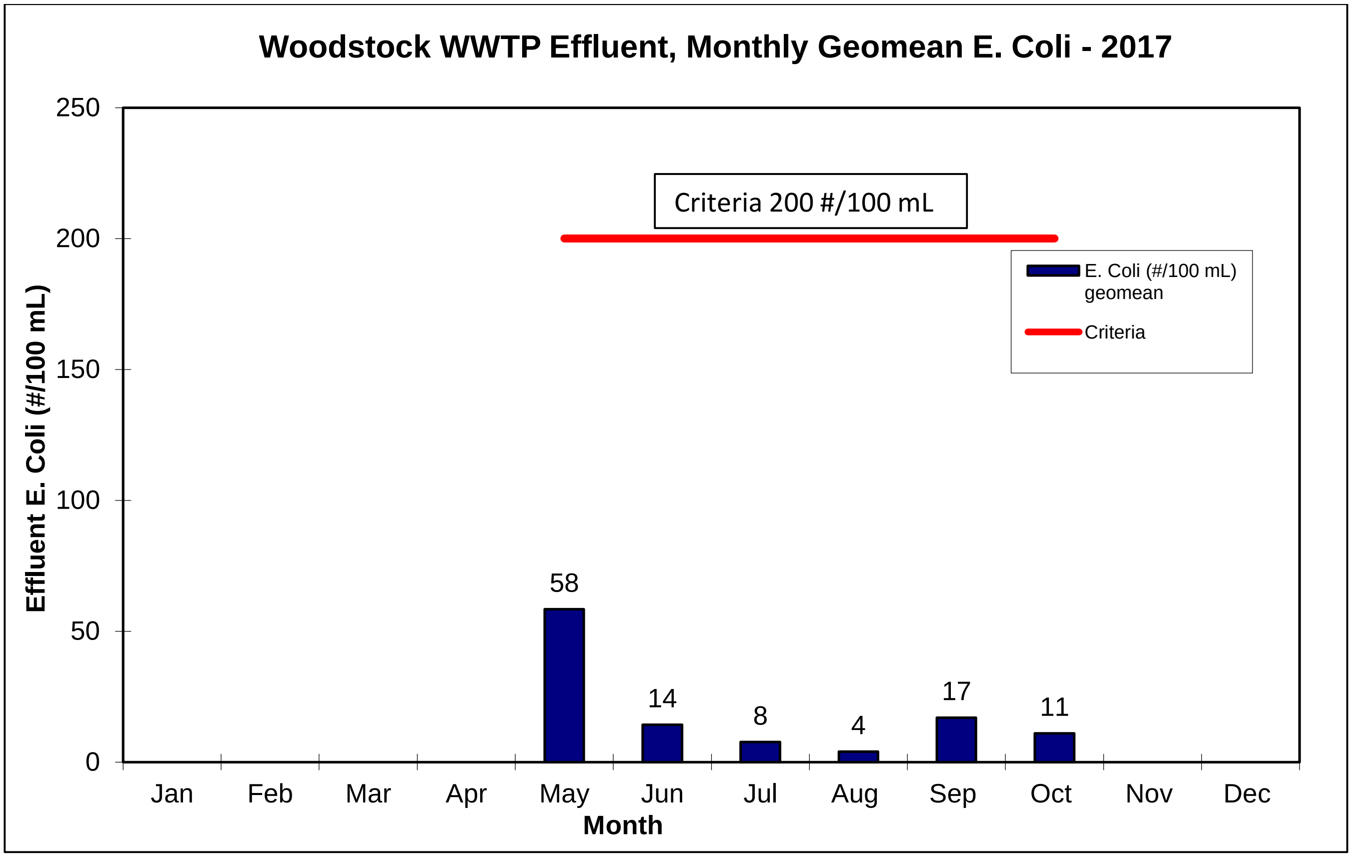
Oct
Nov
Dec
Month


Woodstock WWTP Effluent, Monthly Geomean E. Coli - 2017
Effluent E. Coli (#/100 mL)
0
50
100
150
200
250
Criteria 200 #/100 mL
E. Coli (#/100 mL) geomean
Criteria
58
14
8
4
17
11
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month